Notebook Series -- Notebooks by Experimenters Other Than Edison
Chemical Experiments -- L.F. Ott Books
Notebook, N-15-10-12

This notebook was used by Ludwig F. (Louis) Ott during October 1915-September 1918 for notes on various chemical experiments relating to batteries, phonograph records, and motion picture film. Included are tests on the characteristics of various chemicals, such as tuluol, benzol, and phenol. Some of the experiments were done for Archie D. Hoffman or Sherwood T. (Sam) Moore and pertain to the development of disc records, particularly the varnish. Others relate to chemical work on the electrolyte for storage batteries. Also included are tests on Victor records to examine ingredients, experiments with acetone for the Motion Picture Division, and experiments with ink for use in marking the wax records for the business phonograph. Some of the entries include comments by Edison showing his interest in experiments for making smoke from gunpowder, as well as his supervision of Ott's work. A 3-page index appears at the end of the book. The index has been filmed first. The front cover is marked "Record." The book contains 175 numbered pages, some of which are blank, followed by approximately 15 unnumbered pages

		Page
#964	Sample of Crude Toluol Chas W. Jacobs & Allison	1
966	" " Benzol bar K.T.X. 690	2
970	" " " from Bessemer Ala	4
971	" " " " Cambria	6
972	Potash Exp. for Mr. Moore	7
973	Effect of Sat. Sol Na_2CO_3 on C.P. Phenol	11
974	Same as 973	14
975	Sample Benzol from Cambria Effect of Barometer	19
976	Samples from Mr Masons Exp.	21
977	Exp. on Phenol Titration Methods	29
978	cont. of Exp 976	32
979	Sample of Benzol from new Phenol Plant	33
980	" " " " Pennsylvania Iron & Steel Co	34
981	" " " " Cambria	35
982	" " " " Cambria washed Toluol	36
983	Determination of Phenol in Crude Phenol	37
984	Continuation of Barometer effect on Benzol distill	38
985	Exp. to try Moisture absorbed by Pyrhoms.	41
986	Analysis of K_2SO_4 salt from Alunite	42
987	Sample of Benzol from Innis Speiden	43
988	Analysis of Nitre Cake	46
989	Sample #6 C.P. Benzol from Cambria	49
990	Treatment of Nitrid Grids in Hypo	50
991	Test of Phenols Samples from Hoffman	52
992	Making 6/4 Hydrochloride	54
994	Nitre Cake	57
995	Sample of Electrolyte from S.B. Co	60

		Page
997	Seven Samples Electrolyte S.B.Co	62
998	Sample of Magnesite Analysis	65
999	Saponification test on Sample of Oil & Grease	66
1000	Ore Sample from R.A.Bowle	67
1001	Sample of Chalk (Hoffman)	68
1002	Waxes Sol in Alcohol See Oxles Book	70
1003	Hardness test of metallic alloys for Disc Rec.	71
1004	Varnishes for edges of Disc Record	73
1005	Sample of Benzol Naider Cath & Hastys sent wrong sample	93
1006	Moth Balls	94
1007	Sample of Ore from New Quarry E.P.660	95
1008	Sample of Brown Potash	98
1010	Four Samples of Oil E.P.Wks	100
1011	Analytical Methods to determine shellac in Disc Record Blank	104
1012	Extraction of Shellac of Above with Alcohol	106
1013	Ore Sample & Sample of Iron	110
1014	Benzol from Rommelhoff P.T.X. 2601 Car	112
1015	Analysis of centrifuge Liquor	113
1016	Magnesium Resonate	115
1017	Ferrous Phosphate	116
1018	Analysis of Powd Blank for Shellac also Victor Record	118
1019	2 Samples of Diamonds	120
1020	Test on 2200 gal sample Xylol	122
1022	Report on 8 diamond Samples	123
1021	Analysis of four Oil Samples	125
1022	Sample of Solvent Naphtha	129
1023	" " Diamonds Ehrman & Balsam	130
1024	" " Diamond Dust	131
1086	Analysis Victor Record	132
	Formula for Sheris (Lead Resinate)	133
1087	Sample Wood Flour from Hoffman	134
1088	" Acetone from Moving Picture Div.	135
1089	Analysis of Silver Mud	136
1090	Sample of Acetone Moving Picture Div.	137
1091	Exp. on Inks Marking Pencils Phonograph Records	138—143
1092	Analysis of Parobell Records	148
1093	Jewellers Cement	149-150
1094	Extraction of Victor and Pennddie Records for checking of method	151-152
1095	Government Exp. on S.S.	153-160
1096	Solvent for Neutral Resinate Magnesia for J.A.E.	163
1097	Further Data on Victor Records	165—

85520
Acme Co.,
MFG. STATIONERS,
96 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

Pyrex Glass #II 28.0955

Porcelain small 12.7063

Ludwig Ott
Edison Lab.

964 Sample of Crude Toluol from
Chas. W. Jacobs & Allison 18 Cedar N.Y.
17% Benzole + 37% Toluol
Sp. G. @ 18°C = 0,926
Took 1000 cc
Dist starts at 70°C at 100°C about 50 cc

	column start	
70° to 140° C	350	cc
Residue	640	
	990	

Sp. G. of Residue 0,964

Washed 350 cc (70°–140°C fraction)
2% 50% H_2SO_4
" 7% " " "
" " " "
½ Water
4% 15% NaOH
½ Water
Emulsion
Redistilled ending still to clearly water

	cc	cc Water	Total	Loss
up to 140	275	50	325	50 cc
Residue	50			

continued on page 5

Oct. 12, 15

966 L.O. Sample of Benzole from:
Car # K.T.X. 690 Cap. of Car 80523

°Cent	CC	
70	0	78.9
77.8	2	79.3
78.9	5	79.5
79.3	10	79.6
79.5	20	79.7
79.6	30	79.7
79.7	40	79.7
79.7	50	79.8
79.7	60	79.8
79.7	70	79.8
79.7	80	79.8
79.8	90	79.8
79.9	95	79.9
80.1	97	80.1

97 — 80.1
2 — 79.3
95% — .8 °C

967

968

969

970 L.O. Sample of Sample from Bessemer Ala. Recd. Oct. 15, 15.

Cent.	c.c.
78.3	0
79.3	2
79.5	5
79.6	10
79.7	20
79.7	30
79.7	40
79.7	50
79.7	60
79.7	70
79.8	80
79.8	90
79.9	95
80.1	97

97 cc — 80.1
2 cc — 79.3
95 % — .8

Sulphuric Acid Test 680
on Tenn. Coke Coal.

275 cc fraction after treatment (corrosion)
= 27.5 %

86°	3 cc	0.3 %
109	115 cc	11.5 %
112	25 cc	2.5
mixture	120	12.0
	263	26.3 %

6

Oct 27, 15.

971 L.O. Sample of Sample from barrels used Oct 25, 15.

% Cut	C.C.
78.7	0
79.2	2
79.3	5
79.4	10
79.4	20
79.4	30
79.4	40
79.5	50
79.5	60
79.5	70
79.5	80
79.5	90
79.6	95
79.8	97

97 cc — 79.8
2 cc — 79.2
95 % — .6

Oct. 27, 15.

7

972 L.O. Experiment for Mr. Moore

Sample of Potash solution from the Potash Tanks for cleaning Transfer Plates.

Sp. G. @ 15° C = 1,109 = 14.4 V.P. KOH or 13 Weight % KOH

5 cc require C.C. N/1 H_2SO_4

66.0 — 27.4
56.0 — 24.0
10. cc N/1 H_2SO_4 — 3.4/2 = 1.7 cc N/1 KOH with Methyl Orange

28.2
27.4
.8 cc with Phenol phthalein

10 − 1.7 = 8.3 cc

.056
8.3
168
448
.4648
20
9,29.60

.056
.8
.0448
20
0,8960 as KOH for Carbonate

138.2 − 56.1
8.9
12438
11656
122998 (2.19 % Carbonate / 2
1122
1079
561
5188

1.09
10.38 as KOH + K_2CO_3

972 L.O

Soda Solution

Sp. G. @ 15°C = 1,031

= 3 V.P. = 2.9 Weight %.

71.5
68.0
3.5
.04
140
20
2.800 V.P.

Sp. G. @ 212°F = 100°C = 1,005

Analysis

Found in Potash solution evolution of H_2S on Neutralizing with HCl absent in the Soda Solution.

Potash Lime of Iron and Zinc

Soda [illegible] Cu [illegible] Lime [illegible] Zinc

972 L.O. Experiment

2 Pieces of Brass Pitted $4\frac{1}{2}$" X 2"

= 4.5 X 2 = 9 sq in X 2 surfaces = 18 sq in

Not taking edges into account.

were hung in the Soda Bath and the Potash Bath respectively.

Weight of Piece P = Potash Bath = 81.0378

" " " S = Soda Bath = 79.4729

P			S		
After hrs	Weight	Loss	After hrs.	Weight	Loss

Total weight of a plate = 730 grams.
Diam = 10" therefore the surface of a plate is $10^2 \times .7854 = 100 \times .7854$
$= 78.54 \times 2$ surface $= 157.08$ sq inches

Exp. # 973 L.O.

Experiment to determine the effect of Na_2CO_3 and $NaHCO_3$ (Sat. Sols.) on C.P. Phenol.

Into a 50 cc Glass Stoppered Graduate were put 10 cc of C.P. Cryst. Carbolic Acid from Kommerling about 98-99% — Phenol. Then filled up to 50 cc. mark with a Saturated Solution of C.P. Sodium Carbonate in one cylinder and a Saturated Solution of C.P. Sodium Bicarbonate in the other. Room Temperature. Then both shaken up vigorously for 5 min and let settle:
The Layer of Phenol on top of the Sodium Carbonate solution was 13.5 cc while on the Sodium Carbonate solution only 10.5 cc.

Titration $NaHCO_3$

26.15
18
8.15 cc
.084
3260
6520
68460 (67.3%

Na_2CO_3

27.25 18.6
18.6
8.65
.54
3460
6920
10054) 72660 (72.0 %
70588
20720
20168

$NaHCO_3$ 67.3% 10.5 cc = 7.2 cc Phenol
Na_2CO_3 72.0% 13.5 cc = 9.8 cc Phenol

or 72% of the Phenol in the $NaHCO_3$ bottle
and 98% " " " " Na_2CO_3 bottle.

Titration of the $NaHCO_3$ Liquor

18.2960
17.2383
1.0577

25.7
25
.7

$KMnO_4$ 25
25
00

.084
.7
1.0577) .058800 (5.5% Phenol.
52885
59150
52885

5.5
40 cc
2.200 = 2.2 cc phenol

left in the Liquor.

7.2 Phenol
2.2
9.4

Titration of the Na_2CO_3 solution

Back $KMnO_4$ 25 cc
11 cc
$C_2H_2O_4$ 25 cc

1084
.1
.0084) 00.00 (.58
71585
124150

Weight 18.6700
17.2383
1.4317

1.4317 = 0.58%

500
.13.5
36.5
.58
2920
1825
.22170

9.8
.22
100.2 c.c.

#974 L.O. Same as #973 except used larger quantities

Settled over night

100 cc Phenol C.P. + 400 cc Sat. Sol of $NaHCO_3$ shaken for 10 min. Sp. G. = 1.090
Phenol Layer increased to 113 cc
$NaHCO_3$ sol. reduced to 387 cc

100 cc Phenol C.P. + 400 cc Sat Sol of Na_2CO_3 shaken for 10 min Sp. G. 1.232
Phenol Layer increased to 140 cc
Na_2CO_3 sol. reduced to 360 cc

$NaHCO_3$	original	increase	Na_2CO_3	original	increase
Phenol	100	113		100	140
	original	decrease		original	decrease
$NaHCO_3$ sol	400	387	Na_2CO_3 Sol	400	360
Phenol in Phenol Layer			Phenol in Phenol Layer		
" " $NaHCO_3$ Sol			" " Na_2CO_3 sol.		

Glass #I 26.7107
Glass #II 28.1010

$NaHCO_3$ Sol = 31.7435
Glass #I = 26.7087
5.0348

$KMnO_4$ 1.2
25.0
22.3
2.7

Oxalic 23.5
0.0
23.5
1.2
22.3

.084
2.7
588
168
348).2268,000 (4.1
20 1392
54080
50348
1

1.090
41
1090
4360
4.4690 g Phenol in 100 cc by volume
3.87 cc
312830
357520
34076
7,295030 cc Phenol in the $NaHCO_3$ Liquor

Na_2CO_3 Sol = 33.1842
Glass #II = 28.1010
5.0832

$KMnO_4$ 2.2
1.3
.9
25.0
24.1
.9 cc

Oxalic 485
23.5
25.0
.9
24.1

.084
.9
5.0832).0756 00.0 (1.48
50832
247680
203328
443520
406656

1.232
1.48 % Weight
8856
4928
1232
1.81336 cc in 100 cc
360
10880160
544008
6,528096 0 cc Phenol in the Na_2CO_3 Sol.

Sp. Gr of Phenol Sol 1.065
Phenol from $NaHCO_3$

I 27.7286
26.7080
1.0206

Mnn	Oxalic
.9	16.5
	.9
	15.6

25.0
15.6
9.4

.084
9.4
336
756
77.36

1.0206) 78960.00
71442
75180
71442
37380
30618
67620

77.36 g Phenol in 100 g sol
72.63

1.065) 7736.00
7455
2810
2130
6800
6390
4100

72.63 g in 100 cc
grams Phenol

72.63
1.13
21789
7263
7263
82.0719

Sp. of Phenol Sol 1.000
Phenol from Na_2CO_3.

II 29.1269
28.1010
1.0259

Mnn.	Oxalic
1.5	34.0
.9	16.5
.6	17.5
	6
	16.9

25.0
16.9
8.1

.084
81
084
672
66.32

1.0259) 6804.00
61554
64860
61554
33060
30777
2283.0

66.32 g Phenol in 100 g
140 in 100 cc
265280
6632
92848.0 grams Phenol
6.52
99.36

Nov 10, 15

(17)

Sample of urine from Mr. Musson.
Musson Exp. # 24 Phenol. .930 Liquor 10000
.930
9070

L. Sodium Sol 1230

Glass I 27.7700
26.7087
L- 1.0613

KMn	Oxalic
1.3	25.0
.5	24.1
.8	.9
	24.9
	.8
	24.1

.084
.9
1.5

313) 7560.00
5031.3
2528.70
2515.65

9070
1.84
36280
72560
9070
16688.80

1230
1.5
6150
1230
1845.0

R. Phenol 1100 cc
33.1323

Glass II 28.1010
L- 5.0313

KMn	Oxalic
25.0	17.7
17.2	.5
7.8	17.2

.084
312
624
61.73

10613) 6552.00
63678
18420
10613
78070
74291
37790

61.73
1.100
617300
6173
67.9030

67.9 Phenol
9.30
20370
6111
631.470 g Phenol
166.8
798.270 g Phenol.

975 L.O

Sample Benzol Cambria Reed Nov 10, 15.
Sample # B 3 Bar 760 mm

	Bar 760	Bar. 750	
°Cent	cc	°Cent	°Cent.
79.3	0	79.2	78.
79.4	2	79.4	78.5
79.4	5	79.4	78.6
79.4	10	79.5	78.6
79.5	20	79.5	78.7
79.5	30	79.5	78.7
79.5	40	79.5	78.7
79.5	50	79.5	78.7
79.6	60	79.5	78.7
79.6	70	79.6	78.8
79.6	80	79.6	78.8
79.8	90	79.7	78.9
81.4	95	80.4	79.1
	97		79.7

79.7
78.5
1.2 °C
95%

Bad flask

975 L.O.

Bar 750 mm.

2 samples of Benzole

Bar 750		Bar. 750		Bar 760		
Sample B 1		Sample B 2		50 cc B1	+ 50 cc B 2	
0 Cent	cc	0 Cent.	cc	0 Cent.	cc	
77.8	0	78	0	78.5	0	78.5
78.0	2	78.5	2	79.1	2	79.
78.5	5	78.7	5	79.3	5	79.3
78.6	10	78.9	10	79.4	10	79.4
78.7	20	78.9	20	79.5	20	79.4
78.7	30	78.9	30	79.5	30	79.4
78.8	40	79.0	40	79.5	40	79.5
78.8	50	79.0	50	79.5	50	79.5
78.8	60	79.0	60	79.5	60	79.55
78.8	70	79.0	70	79.55	70	79.6
78.9	80	79.	80	79.55	80	79.6
78.9	90	79.1	90	79.6	90	79.6
78.9	95	79.2	95	79.7.5	95	79.7
79.0	97	79.3	97	79.9	97	79.9
95%	- 1.0°	79.3		79.9	79.9	
		78.5		79.1	79	
		.8		.8	.9	

Titration #1 Sol #1

34.0420
28.1010
5.9410

Sp g = $\frac{59410}{5}$ = 1188

K Mn
25.8
25
8

oxalic
19.5
8
18.7

250
18.7
6.3

.084
6.3
252
504
5292.00000
47520
539200
53490

5.9410

1188
8.9
10692
9504
10.5732 grms Phenol in 100 cc

Exp # 976 L.O

Samples of Liquor and Phenol from Mr Masons Exp. #

Sample #1 Sample of original solution from fusion.
" #2 Sample of spent liquor after passing 56 pct CO_2
" 3 " " " " " " 78
" 4 " " " " " " 100
" 6 " " " " " " 114
" 7 " " " " " " 135
" 8 " " Phenol on top

These samples were all titrated with the Potassium Permanganate Method for Phenol. Samples #1, 7, and 8 were also tried with the Tribromphenol Precipitation Method.

Continuing on next Page—

976 L.0
Sample #1

34.0109
28.1022
5.9087 g Solution.

Sp. G. of Solution 1195

K Mn O_4 15.0
9.2
K Mn O_4 Consumed 5.8

Oxalic 10.0
K Mn O_4 Back .8
Oxalic consumed 9.2

.084 × 5.8 = $\frac{.4872}{5.9087}$ = 8.245% Phenol by weight

8.245 × 1195 = 9.85 g Phenol in 100 cc

Tribromophenol

34.1900
28.1027
6.0873 g Material

41.8760
34.9978
1.8782 g Tribrom

331 : 94 :: $\frac{1.8782 \times 94}{331}$: X

$\frac{176.5508}{331}$ = 0.5330

$\frac{.5330}{6.0873}$ = 8.75
8.24
.51

another Titration gave 8.90
8.75
.15

44.9640
38.8883
6.0757

976 L.0
Sample #2

K Mn O_4 10 cc
4.4
5.6

Oxalic 0
7 cc
2.6
4.4

.084 × 5.6 = $\frac{.4704}{6.0757}$ = 7.7 % g in 100

34.2732
28.1035
6.1697

976 L.O
Sample # 3

$KMnO_4$ 10.0
5.4
4.6

5.1
2.6
2.5

Oxalic 15.1
7.0
7.9
2.5
5.4

$.084 \times 4.6 = \frac{.3864}{6.1697} = 6.2\%$

32.9035
26.7097
6.1938

976 L.O.
Sample # 4

$KMnO_4$ 10.0
7.25
2.75

7.25
5.1
2.15

Oxalic 24.5
15.1
9.4
2.15
7.25

$.084 \times 2.75 = \frac{.231}{6.1938} = 3.7\%$

32.9070
26.7095
6.1975

976.L.O.
Sample #6

$KMnO_4$ 19.0
7.85
2.15

8.9
7.25
1.65

Oxalic 34.5
24.5
9.5
6.4
7.8

$.084 \times 2.15 = \frac{.1806}{6.1975} = 2.9\%$

44.9360
38.8867
6.0493

976 L.O
Sample # 7

10.0
8.4
1.6

7.4
6.8
.6

Oxalic 19.0
10.0
9.0
6
8.4

$1.6 \times .084 = \frac{.1344}{6.0493} = 2.2$ g in 100 g.

Sp G. = 1.225 * 2.2 = 2.695 g in 100 cc

Tribromphenol.

28.2048
27.7912
.4236 g Tribrom

34.3715
28.1024
6.2691 g Material

331 : 94 : .4236 : X

$\frac{4236 * 94}{331} = 0.120$

$\frac{0.120}{6.2691} = 1.91$

2.20
1.91
.09

# 1	8.24 g in 100 g		0.54
# 2	7.7 g in " "	56 feet	1.5
# 3	6.2 " " " "	78 "	2.5
# 4	3.7 " " " "	100 "	0.8
# 6	2.4 " " " "	119 "	0.7
# 7	2.2 " " " "	135 "	

976 L.O.

27.8550
26.7090
1.1460

.0.1221

Sample #8 Phenol Liquor / Phenol on lef.

25.0	10.7	40.0
17.7	7.4	19.0
7.3	3.3	21.0
		3.3
		17.7

$7.3 \times .084 = \frac{.6132}{1.1460} = 53.5\%$

Sp. G = 1.110 × 53.5 = 59.38 g in 100 cc

Tribromphenol

~~28.2148~~
~~27.9117~~
~~.4246 g~~ ~~Tribrom~~

31.5028
29.1517
2.3511 Tribrom

27.8242
26.7084
1.1158

331 : 94 : 2.3511 : X

$\frac{94 \times 2.3511}{331}$ 0.667

$\frac{.0667}{1.1158} = 59.7\%$
535
6.2

977 L.O. Nov. 18, 15

Experiment to determine if the $KMnO_4$ or other Oxidation method is applicable to the determination of Phenol. in the ~~Phenol~~ Sodium Phenolate solution from the fusion or the Schel Salt.

10 grams Schel Salt.? Muck in the two bags. was dissolved in water up to 100 cc & Mixed. and 10 cc taken = 1 g of the original Muck. This was titrated with the Permanganate Method. giving 5.4% Phenol as follows.

10 cc required .6 g $\frac{n}{2}$ $KMnO_4$ for oxidization

10 cc $\frac{n}{2}$ $KMnO_4$
9.4
.6

Oxalic
10
6 $KMnO_4$ Back
9.4

$.084 \times .6 = \frac{.0504}{1.0000} = 5.4\%$

Tribrom phenol Method (Precipitation)

10 cc of above solution Precipitated, after acidifying; with Bromine Water ~~using~~ a slight excess let stand 1 hour filtered on weighed filter, washed until free from acidity dried at 80° C

Sol Weight 28.6639
Glass + Filter 28.5555
.1084

$C_6H_3OHBr_3$ C_6H_5OH

331 — 94 :: .1084 : X

$94 \times .1084 = \frac{10.1896}{331} = 3.07\%$

~~the or~~ To the original ~~solution~~ solution was now added about ½ gram Sodium Sulphite from this solution I took 10 cc and determined Phenol by the $KMnO_4$ method

$KMnO_4$ 10 cc
9.2
.8

Oxalic 44.5
35.0
9.5
$KMnO_4$ Back - 3
9.2

1 gram then consumed .8 cc $KMnO_4$ $\frac{N}{2}$ for oxidization

$$.084 \times .8 = \frac{.0672}{1.0000} = 6.7\% \text{ Phenol}$$

This shows that in the Mixture and the dissolved fusion the Sodium Sulphite formed which is a reducing agent is acted upon by the Permanganate this permanganate being consumed in oxidizing the Sodium Sulphite to Sulphate and counted as being consumed in the oxidization of the Phenol makes the Phenol titration higher and unless the amount of Sulphite is known the titration is not reliable

By the Precipitation method the Bromine which is used to oxidize the Na Sulphite to sulphate is not taken into account as the only thing weighed is the Tribromphenol

976 L.O Summary

9786.0 In diluting sample #8 from exp. #9761.0 found quite a little precipitate so took 250 grams of Phenol (mixtures of various samples in the CO_2 process. and diluted with 4400 cc water.
Filtered off and weighed Residue
some lost in washing some in sublimation

43.4190
39.9610
3.4580

250) 3.4580 (.0138 %
250
958
750
2080

9796.0 Sample of Benzole from New Phenol Plant Received Nov. 20, 15.
Sulphuric Acid test corresponds to # of color card Good Stuff corresponds to Bur 750

Cent.	C.C.
78.2	0
78.5	2
78.8	5
78.9	10
78.9	20
79.0	36
79.0	40
79.0	50
79.0	60
79.0	70
79.05	80
79.1	90
79.2	95
79.4	97

79.4
78.5
.9

34

Nov. 26/15.

980 L.O. Sample of Benzol from -
Dominion Iron & Steel Co
Car K.T.X. 521 Recd 11/25/15.

1st. °Cent.	C.C.	2nd. °Cent
78.3	0	
79.3	2	
79.5	5	
79.6	10	
79.7	20	
79.7	30	
79.75	40	
79.75	50	
79.8	60	
79.85	70	
79.9	80	
80.05	90	
80.5	95	
81.4	97	

97 cc 81.4
2 cc 79.3
2.1

980 L.O. Recd Nov. 26, 15.

35

C.P. Benzol Cambria Sample #4

Cent	C.C.
78.4	0
78.9	2
79.1	5
79.2	10
79.2	20
79.2	30
79.25	40
79.3	50
79.3	60
79.3	70
79.35	80
79.4	90
79.5	95
79.7	97

79.7
78.9
.8

982 L.O.

Sample from Caulsia Mouched 92% Tolueol Rectf. Nov. 26, 15.

°Cent.	c.c.
77.	0
78.1	2
78.6	5
79.0	10
79.15	20
79.2	30
79.2	40
79.25	50
79.3	60
79.3	70
79.3	80
79.35	90
79.4	95
79.5	97

97 79.5
2 78.1
1.4

983 L.O.

Determination of Phenol in Crude Phenol by salting out with Acid and with $NaHSO_4$

Half + Half Acid.

35.3755
34.4345
.9410 g Phenol

K Mn 2.3 back. Oxalic
18.0
.1
17.9
2.3
15.6

25.0
15.6
9.4

.084
9.4
.7896 / .9627 = 82.01%

$NaHSO_4$

39.8490
38.8863
.9627

K Mn. 36
2.3
1.3 back

Oxalic
35.1
18.0
17.1
1.3
15.8

25.0
15.8
9.2

.084
9.2
.7728 / .941 = 82.12%

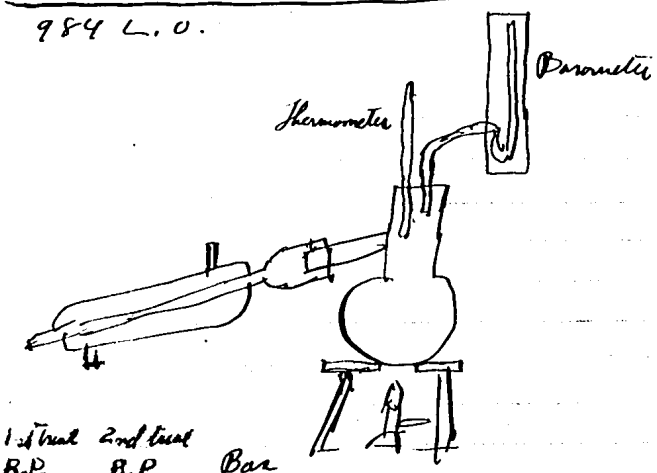
1 gram Na_2HSO_4 heated at 110°C for 2 hrs.

14.0712
13.0810
.9902 g after heating

1.0000
.9902
.0098 loss.

1.) .0098 %

984 L.O.



1st trial B.P.	2nd trial B.P.	Bar	
79.1	79.1	755	.3
79.5	79.4	760	.2
79.6	79.6	765	.2
79.8	79.8	770	.2
80.1	80.1	775	.2
80.3		780	

984 L.O. All distilled at 760 m.m. Bar.

List of Samples of Benzole from Barnhrid
Low Boiling B I and High Boiling B II

C.C.	B I °Cent.	B II °Cent.	50cc BI + 50cc BII °Cent.	25cc BI + 75cc BII °Cent.
0	78.8	78.9	78.9	
2	79.1	79.4	79.2	
5	79.2	79.6	79.25	
10	79.4	79.75	79.3	
20	79.4	79.8	79.3	
30	79.5	79.8	79.4	
40	79.5	79.8	79.4	
50	79.5	79.8	79.4	
60	79.6	79.8	79.4	
70	79.6	79.8	79.4	
80	79.6	79.8	79.4	
90	79.7	79.9	79.5	
95	79.75	80.0	79.7	
97	79.8	80.15	80.0	

79.8	80.15	80.0
79.1	79.4	79.2
0.7	0.75	.8

Cambria

Results.

B.I 78.25 — 77.3 — .95

BII 79.2 — 78.3 — .9

Highest B.P. in BII 79.2

Lowest B.P. in BI 77.3

Diff 1.9

Laboratory Results

B.I 79.8 — 79.1 — .7

B II 80.15 — 79.4 — .75

Highest B.P. BII 80.15

Lowest B.P. BI 791

1.05

50cc BI + 50cc BII 80.0 — 79.2 — .8

75cc BI 25cc BII

75 BII 25 BI

985 L.O.

Exp. to determine Moisture Absorption of Diaphram Material

A = Shellac Anhyde-Alcohol B Shellac Denatured Alcohol

A. Total 35.1608 after 24 hours Total 35.1608

Glass 34.4341 — .7267 — .7267 Moisture Absorbed lost

Glass 35.1581 — .0027

.7267 — .0027 — .7240

.0027 / .7267 = lost 0.37% lost .0027

B Total 39.6523 after 24 hrs Total 39.6523

Glass 38.8864 — .7659 Glass 39.6460

.0063

.7659 — .0063 — .7596 = loss of 0.82%

Moisture Absorbed

34.4341 — .7596 — 35.1937

Put in a desiccator having water on bottom for 24 hrs ~~at~~ at temp. of in the closet.

On 11.00 AM Dec. 6, 15. 12.9%

A 35.2959 — 35.1608 — 18.6% — .1351.000 — 7240 — 627.00 — 57920 — 47800

B. 35.2920 — 35.1937 — 12.9% — .098.300.0 — 7596 — 22340 — 15192 — 71480

8025

L.O. 986 2 grams of K_2SO_4 salt from Alunite for. Water – SO_4 and K.

Total = 30.1039 Total = 30.1039

Glass = 28.1017 30.0018

2.0022 .1021

Salt = 5.1 % loss as H_2O.

$BaCl_2$ Sol. = 10 g $BaCl_2 2H_2O$ in 100

1 cc contains .1 g

53.3 % of 2.0022 = 1.067 g SO_4

244.32 : X :: 96 : 1.067 = 2.715 g $BaCl_2 2H_2O$

required ÷ .1 = 27.15 cc $BaCl_2 2H_2O$ Sol.

required for the precip. of the Sulfbate.

47.5604 2.6089 X .41155

44.9515

2.6089 g $BaSO_4$ = 1.0736 g SO_4

$\frac{1.0736}{2.0022}$ = 53.64 % SO_4

.5015 g require 1.1 cc $\frac{N}{2}$ KOH

1 cc $\frac{N}{2}$ KOH = .024 SO_4 X 1.1 = .0264

$\frac{.0264}{.5015}$ = .05.24 g SO_4 in 1g

= 5.24 % SO_4 Free.

987 L.O. Sample of Benzole from Innis Speiden Co. Recd Dec 8, 15.

Bar. 750 m.m.

cc	°Cent.
0	77.8
2	78.5
5	78.7
10	78.8
20	78.9
30	78.9
40	78.9
50	78.9
60	78.9
70	78.9
80	78.9
90	78.9
95	78.9
97	79.0

79.0

78.5

.5

Took filtrate from $BaSO_4$ Precip. diluted to 250 cc and took 25 cc
Added 20 cc 5% $PtCl_4$

Total = 13.1622
Crucible = 12.7087
K_2PtCl_6 .4535 g × 10 = 4.535 g

4.535 × .16084 (Factor) = .7294 g K

or

4.535 × .35846 (Factor) = 1.6156 g K_2SO_4

$\frac{1.6156}{2.0022}$ =

#9884.0.

2.0148 g [illegible] for. Nitric Acid ~~Sulphuric~~

~~g [illegible] 40.1 cc $\frac{1}{10}$ M KOH~~

.5080 g require 38.7 $\frac{1}{10}$ N KOH

80.7
41.0
38.7

35.4360
34.4360
1.0000 g Sample

9882.0.

2.0148 grams Nitre Cake for Nitrates by the Method gave

50 cc $\frac{1}{10}$ N H_2SO_4 require 50.3 cc $\frac{1}{10}$ N KOH

Sample 50.3
49.6
1.7 cc H_2SO_4 converted into Ammonium Sulphate

1.7 X .0049 = .00833 g H_2SO_4

$(NH_4)_2SO_4$
132.14 : X :: 96 : .00833 = $\frac{1.1007}{96}$ = .0114 g $(NH_4)_2SO_4$

.0114 X .2578 factor = .002938 g NH_3

.002938 X 3.7 factor = .010874 g HNO_3

$\frac{.010874}{2.0148}$ = 0.53% HNO_3

Second Trial

5.0129 g Nitre Cake required 37.2

50.3
37.2
13.1

.0049 X 13.1 = .06419 sulphuric

$\frac{.06149 \times 132}{96}$ = .0882

.0882 X .2578 = .0227

.0227 X 3.7 = .08399 HNO_3

$\frac{.08399}{5.0129}$ = 1.6%

Acidity

.5080 g require 38.7 cc $\frac{1}{10}$ N. KOH.

.5080 X 19.15% Na in $NaHSO_4$
= .09728 g Na

.0972 : X :: 142 : 46

$\frac{.0972 \times 142}{46}$ = .3000 g Na_2SO_4

$\frac{96 \times .3}{142}$ = .2081 g SO_4 in Na_2SO_4

~~50~~ $\frac{.5080 \times 96}{120}$ = .4006 g SO_4

.2081
.1925
.1896
.0029

38.7 X .049 =

.0.1

1.0000g sample Nitre Cake gave
1.9213g $BaSO_4$

14.6300
12.7087
1.9213 x .41155 .7907 SO_4

120.08 − 96 : X : .7907

$\frac{120.08 \times .7907}{96}$ = 98.9% $NaHSO_4$
.9.8% Nitrs
99.88
.53
100.41

Dec, 29, 15.

#989L.0.

Sample #6 C.P. Benzole
from Cambria Rect Dec. 28, 15

1st Time °Cent	cc.	2nd Time °Cent
78.4	0	78.
78.8	2	78.75
79.1	5	79.1
79.2	10	79.15
79.2	20	79.2
79.25	30	79.2
79.3	40	79.2
79.3	50	79.2
79.35	60	79.2
79.4	70	79.25
79.4	80	79.3
79.45	90	79.35
79.5	95	79.45
79.6	97	79.6

3rd Time	
97 cc	79.60
2 cc	78.75
95%	.85

4th Time	
97 cc	79.6
2 cc	78.8
95%	.8

Dec 30, 15.

990 L.O.

8 Nickel Grids. Marked as follows
Four Plates 19 20 718 and Four Plates 19 20 723

were put into a square glass jar containing 3600 cc of a Sol of Sodium Hyposulphite of 1138 at 13 °Cent. made by dissolving 1200 grams Sodium Hyposulphite (Granular) in 4000 cc Distilled Water. The jar was then covered with a glass plate cemented in with beeswax & Rosin A small hole in the center of the cover plate on which a small glass plate was placed allowed the gases to escape but prevented air from entering

Put on Dec 30, 15 at 12.06 Noon

Off at Jan 7 15 at ~~10.00~~ 8.00 P.M. A.M.

The four grids Marked 19-20-723 taken out of hypo and put in 3% KOH Sat. Jan. 8, 12.30 P.M.

19, 20, 718 } Total Hours in Hypo 658 hours

Wed Jan 27 8.00 AM.

19, 20, 718 } Grids taken out of Hypo and put in 3% KOH

June 7, 1916

Exp # 991 L.O. Sample of Phenol from Hoffman. # 618 Parke –

Total weight = 147.5
Flask = 47.5
Phenol Distilled 100.0 g

#1

Total weight 63.2
Flask 62.6
Up to 178°C = 0.6 g

#2

Total Weight = 175.0
Flask. 78.4
Dist bet. 178 – 182 96.6 g

#3

Total weight. 50.2
Flask 47.5
Residue — 2.7 g

Nearly all dist bet. 179.7°C and 180°C

up to 178°C = 0.6 g
178 to 182°C = 96.6 g
Residue = 2.7
Total — 99.9 error 0.1 g

Residue cloudy black –

991 L.O.

Sample # 630 (white)
100 g taken

Total Weight = 46.2
Flask – 44.7
Residue 1.5

Total Weight = 84.1
Flask 82.4
up to 178°C 1.7

178 to 180°C by difference = 96.8 g.

Nearly all come over bet. 179.8 – 180°C
Residue clear probably contains a little more phenol

Sample 618 Residue does not dissolve totally in H_2O but that which is insoluble in H_2O is soluble in alcohol.

Sample 630 Nearly Total Residue Soluble in H_2O

992 L.O. 6/4 HCl (Hexamethylene Tetramine Hydrochloride.)
450 grams of 6/4 are dissolved in 1000 Cubic Centimeters of Denatured Alcohol (hot) let cool ~~until the 6/4 will just begin to~~ so that the temp is about 45–50°C then add. 117.3 grams HCl C.P. = to 317 cc of Baker & Adamsons 37% C.P. HCl.

140 : 36.5 :: 450 : X
$(CH_2)_6N_4$ — HCl :

$\frac{450 \times 36.5}{140} = 117.3$ $\frac{117.3}{.37} = 317$

When nearly all added ~~let~~ settle take out a small sample and see if HCl still precipitates more Hydrochloride when this ceases then it is done.
Cool Filter ~~and~~ wash with a little alcohol to free it of mother liquor —

Dissolved in H_2O add HNO_3 add $AgNO_3$ white ppt showing HCl present.
Heated in a delicate Bunsen decomposes gives off odor of Formaldehyde and the fumes turn Red Litmus Blue. showing Ammonia

993 L.O. Test of. #29 Run Phenol Resin for free Phenol by the following Method 1 gram Resin dissolved in the least possible quantity of NaOH (10%) then diluted with 100 cc H_2O and Precip with HCl until just acid to Litmus then filtered and washed. Filtrate precip with Excess Bromine Water at bet. 60–70°C.
O = Original Sample.
E = Sample treated twice with Boiling water 200 cc each time for 15 minutes.

Total Weight = 35.9275
O Glass + Filter = 35.6635
.2640
94
10560
23760
330) 24816 (75.2
2310
1716
1650
660
660
15.04

330.9 ± 94

E Glass + Filter = 26.0692
25.9172
.1520
94
6080
13686
330) 14280 (43.3
1320
1080
990
90
8.66

994 L.O. 1000 grams. Nitric Coke
#2 Sample dissolved in 1000 cc Water.
then 1000 cc Sump-Liquor neutralized with
the above mixture. (after filtering)
let settle seperated the phenol. filtered the
phenol then distilled 100 cc of it

Total Weight. 49020
Weight of Flask = 45.820 g
3.20 g residue

for #2 sample
Distilled up to 190°C

#1 Sample same as #2 sample

Total = 48.750
Weight of Flask = 45.820
2.930 g residue

All 1g samples.

Tribromphenol Method for free phenol

35.9587
35.7036
.2551 g Original

26.0934
25.9361
.1573 Experiment

$C_6H(OH)_2Br_3$ C_6H_5OH

331 : 94 : .2551 : X 7.3 %

331 : 94 : .1573 : X = 4.4 %

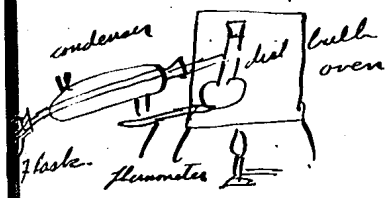
36.3744 Original
36.1020
.2724 7.7 %

26.4600
26.2824
.1776 5.0

995 L.O. Sample of Electrolyte from Storage Battery Cell Also Bottle of Electrolyte taken from Drum.

Cell Trace of Sulphates
Much Chlorides
Nitrates Present as trace
Ammonia quite a little
Prep. with Tannic Acid in Acetic Acid Sol
Drum Trace of Sulphates
Much Chlorides
No Ammonia
Quite a little Nitrates
Quite a prec with Tannic acid in Acetic Acid Sol..

996 L.O.
Test to see if our regular schedule for baking Varnish Blend is volatilized with the Alcohol



Receiving Flask Wt. = 55.9 g.
Distilling Flask Wt. = 42.835 g.

Feb. 8, 15

997 L.O.

Seven Samples of Electrolyte received from E.S.B. 60 Feb. 8, 15.

Receiving Report	Drum No
13019	347 F
12888	463 F
F3447	411 D
F3320	445 H
F3583	489 F
F3300	410 F
F3525	438 H

Qualatative

Nitrates All contain traces of nitrates except # 410 F which contains quite some.

Chlorides All contain Chlorides 410 F 438 H 445 H contain the most. 438 H = .27% KCl

Sulfates All contain weighable amounts of Sulfates.

Heavy metals H_2S group

All contain traces 410 489 F contain the most.

NH_4S group

the following contain quite a little precip.
411 D, 489 F, 445 H, 463 F, 438 H. 438 H very much of a precip.

NH_4CO_3 group.

Titration for organic.

10 cc. of Sample consume the following c.c. $\frac{n}{2}$ $KMnO_4$

445	1 cc	= .0064 g	Oxygen
~~347~~ =	.7	.1044	"
463	1.5	.0096	"
411	.4	.0025	"
489	1.3	.0083	"
438	1.	.0064	"
410	9.5 c.c.	.0608	"

Zinc Quantative

438 N

105 ~~gave~~ the following Electrolysis as Metallic Zinc

57.8770
57.8316
.0454 x 10 = .454 g Metallic Zinc

in 100 cc Solution.

445 H .026 g
411 D .034 g
463 F .035 g
489 F

998 L.O. Report handed in Mar. 4, 16

Sample of Magnesite marked Raw Magnesite Grade E-26 from Foote Mineral Co. Phila. 1 g Sample.

29.0983
29.0880
.0103 = 1.03% H_2O

12.7187
12.7048
.0139 = 1.39 SiO_2

12.7200
12.7048
.0152 = 1.52% $Fe_2O_3 + Al_2O_3$

13.6420
12.7041
.9379 +

12.7360
12.7048
.1312

.1312
1.0691 $Mg_2P_2O_7$ = 80.95 $MgCO_3$

12.7420
12.7048
.0372 = 3.72% CaO = 6.64 $CaCO_3$

H_2O =	1.03%
SiO_2 =	1.39%
$Fe_2O_3 + Al_2O_3$ =	1.52%
Ca O 3.72 = to 3.72 = $CaCO_3$	6.64
Mg O = to 38.71 = $MgCO_3$	80.95
Total	~~91.53~~
Organic Matter = to % as Oxygen =	1.21

999 L.O. Mar 4, 16

One sample of Oil also one sample of grease received from Mr. Constable Feb 28, 15, bought from Old Oil Co were tested for Saponification figure

Both samples have no saponification figure therefore they are free of Mineral and Fatty Acids. reported as such

Mar. 4, 16.

Mar. 14, 16

1000 L.O Report handed in

Ore Sample from R. A. Bowle
The Columbus Inquirer-Sun
Columbus Georgia.

Total Taken = 1 gram
Insoluble = %.
Pb. S. = 47.02% = to 40.7% Pb.
Total ... =
Also zinc This % is not ~~figure~~ as there was a lot of gang in the sample taken the White part ~~[illegible]~~ ~~Magnesia~~. consists mostly of Calcium and some Magnesia.

1001 C.O.

Sample of chalk ($CaCO_3$) from Hoffman (al.)

56.3495
55.0815
1.2680 g taken

56.3495
55.8320
.5175 CO_2

= to .40.81 for 1 gram = 40.81% CO_2

12.7067
12.7048
.0019 Insoluble.

12.7150
12.7048
.01.02 $Fe_2O_3 + Al_2O_3$

12.7200
12.7048
.0152 = $Mg_2P_2O_4$ = .55% as MgO

29.0955
29.0915
.0040 = 0.4% H_2O

13.2400
12.7048
.5352 g CaO

= .9551 = to 95.51 g $CaCO_3$

Insoluble	00.19%
$Fe_2O_3 + Al_2O_3$	1.02%
H_2O	0.40
Mg as $MgCO_3$	1.85
Total Ca figured as $CaCO_3$ =	95.51
	98.27

40.81 CO_2 figured to $CaCO_3$ = 92.81%

40.81 X 2.27431 = $CaCO_3$

Found by the sugar method (1 gram substance boiled with 100 cc of 10% Sugar ~~from~~ Solution formed Calcium Saccharate from the CaO, while the $CaCO_3$ remains undissolved.
Titration showed that there was required to neutralize 1. cc of $\frac{1}{10}$ n HCl.

= to 1. X .003646 = .03646 HCl.
X .7906 = .0297 g CaO = to 2.97% CaO.

Total Ca by Oxalate Method figured as $CaCO_3$ = 95.51
Ca CO_3 figured from the CO_2 evolved = 92.81
CaO by difference = 2.70%

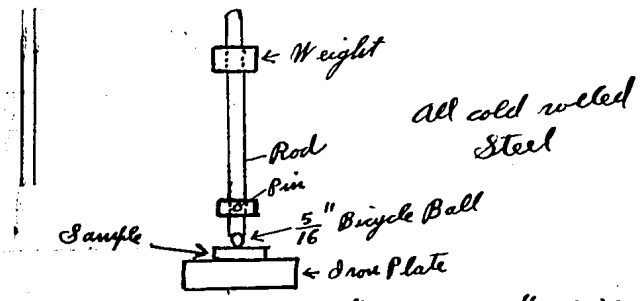
Waxes Soluble in Alcohol. Mar. 16, 16

1002 L.O. See # Oxleyfe.

1003 L.O.

Hardness determination of Metallic Compositions for Disc Record.

Made a hardness Tester as per sketch



Dimensions Iron Plate $3\frac{1}{2}$" diam X $\frac{15}{16}$" Thick Smooth on both sides.

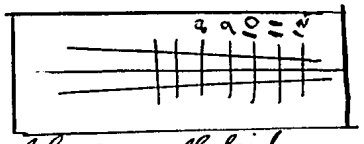
Weight $1\frac{15}{16}$" diam X 3/4" Thick with a 3/8" hole in the middle corners rounded off

Rod. 3/8" diam $19\frac{1}{8}$" long cuffed out at one end 1/4 of the diam of a $\frac{5}{16}$" Bicycle Ball 2 1/2" from this cuffed end is an Iron disc $1\frac{15}{16}$" diam X 7/16" thick.

Principal

The top edge of the weight is placed flush with the end of the rod. The weight is then allowed to fall (care being taken that the rod is held perpendicular)

The diam of the impression made in the sample gives the degree of hardness a scale having been made for same as per sketch



Clear celluloid

The Celluloid Scale is placed over the impression and moved so that the ~~diam~~ edges of the impression just touch the diverging lines on the scale and the corresponding Number read off.

All samples 3/4" diam X 1/4" thick smooth.

No.	Composition	Hardness
1	Lead	7
2	Tin	7
3	45 Lead 5 Tin	6
4	40 " 10 "	6
5	35 " 15 "	5
6	30 " 20 "	5
7	25 " 25 "	5
8	48 " 2 Antimony	7
9	45 " 5 "	8
10	40 " 10 "	
Standard.	Fuse Wire	8

Varnish for edges of Disc Records

1004 L.O. May 24/16.

Varnish must be black and dry with a gloss also must be waterproof.

The following painted 1 coat on strips 1" X 3 1/2" latest condensite Blanks.

1004-1 Best Black Asphaltum
Newark Varnish Works. Nearly dry on glass plate in 30 min

1004-2 Carbonizing Coating Paint ✓
The Goheen Mfg. Co
very slow drying and rough.

1004-3 R.I.W. Damp Proof Paint Joch Brothers
Still sticky at 30 min. ✓

1004-4 Air Drying Japan from Phono Works.
Practically dry in 30 min ✓

1004-5/ g. Elaterite in c.c. Benzol

1004-6/ g Gilsonite cc Benzole

1004-7/ g Prime Cuban Asphalt cc Benzol

1004-8/ g Crude Trinidad Asphalt cc Benzol

1004-9/ g Hard Mexican cc Benzol

1004-10/ g. Soft Mexican in cc Benzol

1004-11/ 7 oz Acid Resisting Kapak Paint (Refined Elaterite) Minneapolis Minn.

1004-12/ Dolfles Alkali Resisting Varnish John C. Dolfle Co. Newark N.J. Thinned with Benzol

1004-13/ Hiffs Waterproof Filler American Chemical & Mfg Co Norfolk Va.

1004-14/ Paracite Dr. Otto Schott.

1004 — 15 Solvay Shop Paint Semet Solvay Co
Syracuse N.Y.

1004 — 16 Solvay Stack Paint same company
as above.

1004 — 17 Key Brand Storage Battery Enamel
Interstate Chemical Co 12-20 Bayview Ave Jersey City

1004 — 18 Frosts Kapals Extra —

1004 — 19 Frosts Pullman Black

1004 — 20 Frosts #2 Cement.

1004 — 21 Frosts #1 Cement.

1004 — 22 Black Carbon Enamel Paint
Walpole Rubber Co

1004 — 23 Alkali Resisting Varnish
Ault & Wiborg Co 63 Green St. N.Y.

1004 — 24 Black Insulating Varnish
Eugene Noie ? Broad & Ryler Sts Phila Penna.
Dries to below

1004-25 PtB. Paint The Standard Paint. Co 100 William St. N.Y.

1004-26 Elastic Black Roof Paint Coal Tar Product Co 77 Maiden Lane N.Y.

1004-27 Shellac & Lamp black from Carpenter Shop.

1004-28 Black Japan Grade #2

1004-29

1004-1 to 1004-9 and 1004-11 to 1004-27 in water covered 1 to 1½ miles from bottom at 9.00 A.M. May 26/16.

Report at 10.30 A.M. Time 1½ hrs.
Swollen Varnish Peels OK

1004-18
1004-19
1004-22
1004-23 and Split
1004-24
1004-25 and split
1004-27
1004-1
1004-2
1004-3
1004-4 and Split
1004-11
1004-12 and split
1004-14
1004-13
1004-15 slightly swollen
1004-16
1004-17

All no good within 1 hour

1004-1 to 1004-4 and 1004-11 to 1004-28 duplicated and washed 1004-1A 4A etc. but with very thin coats of paint all were diluted with benzole except alcohol for # 1004-27A and acetone for 1004-28A.

1004-29 B.S. in Benzole

1004-30 blown Wood Oil in Benzole

all in water May 29, 16 at 8.30 A.M

Completely Gone. May 29/16 9.10
4 A
18 A
2 A
20 A
22 A
1 A

May 29/16 11.00 A.M.
3A Badly Swollen.
11A " "
12A " "

19 A
23 A

Completely Gone Badly Swollen
13 A
26 A
27 A

25 A
28 A

May 29/16 2.10 P.M.
29 A completely gone
17 A Badly swollen
16 A Badly swollen
15 A " "
21 A " "

May 31, 1916 - 8.50 A.M.
36 A - Badly swollen.
14 A - All gone.
24 A - " "
31 - Badly Swollen.

1004-31 Dipped in Molten Ceresine until no more bubbles taken out wiped off in air at 2.30 PM

1004-32 Dipped in Molten Paraffin, same treatment as # 1004-31

1004-33 Dip. of 1004-31 in 1 min

1004-34 Dip of 1004-31 except not wiped off just let drip. in 1 min

at 11.00 AM May 31

1004-35 Dip of 1004-32 except not wiped off.

1004-36 g Ceresine in cc Benzole

1004-37 g Paraffin in cc Benzole dipped in the sol. in 1 min

at 3.45 P.M. May 31st.

May 31, 1916

3 Hours.

Completely Gone - Badly Swollen

1B 2B.

3B 4B

11B

12B

13B

14B

15B 16B

17B

18B

19B 20B

21B

22B

23B

24B

25B

26B

27B

28B

29B

B - S.
30 B.

35 O.K.
32 O.K.
33 O.K.
34 O.K.

37 Badly swollen in 1 hour

At end of hrs Thursday June 1 at 8.30 A.M.

36 Badly swollen just slightly to crack

35 Very Slightly swollen

32 Very Slightly swollen

33 " " "

34 " " "

8.30 AM June 2 Aftr 45½ hrs

Numbers 32 and 35 swollen some "

Record $\frac{210}{1000}$

1004 - 38. Rubbed with Fowlers Tinnature Polish.

2

Dry in 10 min. Dry dull

On 8.55 A.M. 9.55 1 hour Slightly to crack

2nd hour Badly swollen 3 hour Badly swollen

$\frac{260}{1000}$ soft could dig out fingers.

3

Just a little tacky in 20 min Dry a little dull

dry after 1 hour 1 hours swollen 3 hrs swollen

Swollen $\frac{235}{1000}$ at greatest point at 3 hrs

lots of slight cracks.

4

Just a little tacky in 20 min Dry bright

Dry within 1 hour

1½ hours Swollen Quite a few small

cracks 3 hrs Swollen $\frac{225}{1000}$.

71

Just a little tacky in 20 min Dry Bright

Dry within 1 hour

Swollen in two hours.

Lots of small cracks.

3 hrs $\frac{235}{1000}$

12

Dry bright Dry in 10 min

2 hrs Swollen 3 hrs Badly swollen

soft could break off chips

3 hrs Swollen $\frac{255}{1000}$

13

Bright Still Tacky in 20 min

" " after 50 min

2 hours Swollen

Badly cracked.

3 hrs Swollen $\frac{249}{1000}$

14

Bright Gloss Still Tacky in 20 min

" " after 50 min

1st hour a little swollen Badly swollen 3rd hour.

Badly cracked 3rd hour Swollen $\frac{255}{1000}$

15

Glossy Still Tacky in 20 min

Dry after 40 min ✓

In 8.55 9.55 1 hour started to crack

Swollen 1st hour — 3rd hour Badly swollen

3 hrs Swollen $\frac{263}{1000}$

16 Bright Still tacky in 20 min

" Sticky after 40 min

In 8.55 9.55 1 hour Started to crack

Little Swollen 1st hour Badly swollen 3rd hour

Badly cracked 3rd hour Swollen $\frac{275}{1000}$

17

Dry dull Dry in 10 min

1st hour swollen to 1½ hrs Badly swollen

1 great big crack where chipped off.

3 hour Swollen to $\frac{250}{1000}$

18

Brightest Luster Still Tacky in 20 min

" " after 1 hour

after 2 hours just Swollen 3rd hour Badly swollen

One chip out Some breaks.

3rd hour Swollen $\frac{255}{1000}$

19

Gloss — Still Tacky in 20 min

Dry after 40 min

1st hour swollen 2nd hour Badly swollen one large

chip out. 3rd hour swollen to $\frac{295}{1000}$

X 20

Dries Dull Still little tacky in 20 min

" Sticky after 40 min

In 8.55 9.55. 1 hour OK

2nd hour swollen 3rd hour swollen to $\frac{240}{1000}$

21

Dries Dull Dry in 10 min

1st hour Swollen 2nd hour Swollen

3rd Badly swollen Large chip out.

3rd hour to $\frac{258}{1000}$

X 22

Dries Dull Still a little tacky in 20 min
" " " 40 min

1st + 2nd hours OK swollen in 3rd hour.
3rd hour to $\frac{230}{1000}$

23

Dries Dull Dry in 10 min.
Swollen 2nd hour Badly swollen in 3rd hour. 1 large crack about ready to chip out.
to $\frac{263}{1000}$

X 24

Dries Bright Still Little tacky in 20 min
" " " after 30

In 8.55 9.55 1 hour OK
3rd hour swollen to $\frac{235}{1000}$ Edge originally chipped fairled over

X 25

Dries Bright Dry in ten min

OK 1st hour. same 2nd hour
Original record $\frac{230}{1000}$ 3rd hour swollen to $\frac{230}{1000}$

26

Gloss Sticky
" after 30 min

2nd hour swollen 3rd hour swollen more
1 chip out Swollen to $\frac{240}{1000}$

27

Dries Bright Dry in ten min.

1st hour swollen, 2nd hour more swollen
3rd hour badly swollen 3rd hour swollen to $\frac{265}{1000}$

28

Dries Dull Dry in ten min
Started to crack

In 8.55 9.55 1 hour
1st hour very swollen 2nd hour badly cracked 3rd hour long piece chipped off.
swollen to $\frac{285}{1000}$

X 29

Dries Dull Dry in ten min

swollen 2nd hour only a little chipped edges that originally fairled over.
Swollen to $\frac{213}{1000}$

30

Dries Dull Dry in ten min.

1st hour swollen 1½ hours badly swollen some cracks.
3rd hour swollen to $\frac{240}{1000}$

38 Fowler Lustral.

Dries Dull Not quite dry after 30 min

Rubbed on with rag and rubbed off
Swollen 2nd hour.
3rd hr swollen to to $\frac{235}{1000}$

90 Blanks swells in 45 Min

39 Mango Pitch in Benzole
Press in 10 min Fairly Bright
Dr 12.00 1.00 1.30 2.00 2.30 3.00
OK OK OK OK Slightly [illegible]
3.30 Curves at S. 4.30 Edges of all little more thin at 3.30
5.00 Swollen a little

41 Blanks - gone in 3/4 hrs.

42 Jetalong Paint

43 B.S. in Benzole + Prime Cuban asphalt.

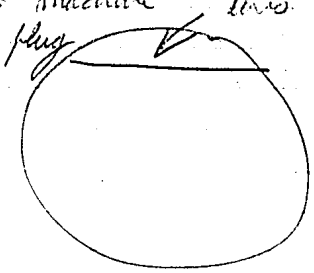
44 New Style Record ready to go to a Tale
Shellacd edges
Dr 2.30 P.M. 3.30 P.M Swollen
4.00 Swollen. 4.30 Edges turn up quite a little
5.00

45 Beeswax + Benzole + Prime Cuban Asphalt

39 A Dr 9.00 A.M. 10.00 AM Swollen a little

44 A Dr 8.30 AM. 10.00 Swollen a little

X Same as # 44 in 10.00 out. 3.00 swollen a little Rather when tried on Machine. Has spot bumps like a missing plug



1005 L.O. June 22/16

Sample of Benzol from Marden Orth & Hastings Co. Inc. 61 Broadway N.Y.
Remarks N.J. Ave R. Near Lincoln highway

C.C. of drop.	°C
2	
5	
10	
20	
30	
40	
50	
60	
70	
80	
90	
95	
97	

1006 L.O. June 30, 16

Naphthalene or Moth Balls

To find how made binder and adulterations.

Dissolved in Alcohol without residue
" " Benzol Slight residue (Trace)
" " Acetic Acid Without residue
" " Oxalic "

On Ignition leaves a trace of residue.

Melting Points	79.8
" "	80.4
" "	80.4
	2406
average	80.2

should be 80.05

Finish Moth Balls are made by compressing pure Naphthalene as experiments thereon show. Reg Sublimed Naphthalene from Woodward Forest sold in a mold in Vice give a good hard compressed ball —

1007 L.O. Sample of Ore from New Quarry E.P. Cement Co.

Total	8.2015
Crucible	7.2635
Insoluble	.9380

5).9380 (.1876 = 18.76%

After H_2S brought up to 1000 for aluminit part for $Fe_2O_3 + Al_2O_3$ took 100 cc

Total = 73600
Crucible = 7.2637
$Fe_2O_3 + Al_2O_3$ = .0963 × 10 = $\frac{.963}{5}$ = 19.26% Fe_2O_3 etc.

= 30.31% as FeS

Total = 58.4280
Plat dish = 58.3686
.0594 from 100 cc in 1000 cc

Zinc
this are 5).5940 (11.88 = 11.88%

= 17.7% as ZnS.

CaO. 7.3065
7.2637
.0428 × 10 = $\frac{.428}{5}$ 8.56% CaO

H_2S group

Total = = 72660
= 7.2637
.0023 g as Sulfides

×10 = $\frac{.023}{5}$ 0.46 %

$Mg_2P_2O_7$ 7.3027
7.2637
.0390 ×10 = $\frac{.390}{5}$ = 7.8 % $Mg_2P_2O_7$

= % MgO = % $MgCO_3$

Free Sulfur Extracted by CS_2 from 1 g Ore
= 0.074 g

Totals

Insoluble	18.76
H_2S group mainly Antimony	4.00
$Fe_2O_3 + Al_2O_3$ figured as FeS	30.32 = Fe_2O_3 15.26
Zn S	17.70 = Zn 11.58
CaCO3	15.27 = CaO 8.56
$MgCO_3$	5.90 = MgO 2.74
Free Sulfur	7.40
	99.35
Moisture	

$Fe_2O_3 + Al_2O_3$

29.0980
Moisture 28.0980
1.0000 g

29.0980

Free Sulfur by difference
Total balance of 1 g Ore = 1.9400
after extraction =

Total = 8.9260
Insoluble = 7.2637
1.6623
Less Sulfate Baso4

Total 28.440
Glass = 28.400
H_2S .040

July 29/16

1008 Sample of Bromo Potash (Hoffman)
Mr. Chas. Edison received following report

KOH by titration	61.22	61.22
Carbonate figured as KOH	9.84	12.11
Total Alkalinity Value 71.06		
Chloride as KOH	3.73	4.96
Sulphate as KOH	10.98	17.08
Insoluble in H_2O		1.01
	85.77	96.38

Actual KOH K_2PtCl_6 method 86.33
85.77
Error — .56

Total 30.1480
28.0955
2.0525 taken made up to 200 cc
For titration took 25 cc each case.

Carbonate
16.0 4.8
3.0 .4
6.0 .14
5.6 × 8 = 44.8
44.8 × .028 = 1.2544
= 61.22 as KOH

Hydrogen peroxide
9.5
3.0
6.5 × 8 = 52.0 × .028
= 1.456 = 71.06

28.9240
28.5700
.3740 K_2PtCl_6

71.06
61.11
9.52 % KOH combined with CO_2

K_2PtCl_6 taken 1.
found .3740 × 20 = 7.4800
7.4800 × 56.11 = 419.7028 / 46.16
= 8.61 Kg KOH

Chlorids 25 cc taken

28.5650
28.5405
.0245 × 8 = .24738 × .19555
.0484848 KCl × 74.56 / 3546 = .1019 KCl / 2.0525
= 4.96% KCl 4.96 × 56.11 / 74.56

= 3.73 KCl as KOH

Sulphates

12.7650
12.7063
.0587 × 8 .4696 × .4115 = .193240 SO_4

.193240 × 174.27 / 96 = .1691 g K_2SO_4 × 2 = K_2SO_4

3383 / 20525 = 16.46 corrected 17.08 × 56.11 / 174.27 = 10.98%
as KOH

Insol 12.7272
12.7063
.0209 / 2.0525 = 1.01%

Aug. 7/16.

#1 Diamond Oil L.C. 100 g

Sp. G. @ 15°C = 0,8730

Viscosity (Reilly) @ 70°F. = 4 min 50 sec.

" " @ 210°F. = 0 min. 32 sec.

Flash Point 218°C = 424°F.

Saponification Figure = 8.1 mg

Iodine Figure = 12.03

Acid Figure = 0.27 mg für 1 gr. 0.13

Fatty Oils = 4.3%

Saponification

25 cc ½ KOH Lösung verlangt 22.9 cc ½ H_2SO_4

22.9 − 22.6 cc verlangt zum zurück titrieren = .3 cc

$\frac{.3 \times .0561}{2}$ = .008,41 mg KOH

65.3384
64.3100
1.0284

$\frac{.008,41}{1.0284}$ = 8.1 mg.

Iodine Jod zähl. 25 cc verlangt 25.1

verlangt 18.6 Thiosulfat

Total 64.9900
Glass 64.3100
.6800

25.1 − 18.6 = 6,5 X .01259 = .081835

$\frac{.081835 \times 100}{.6800}$ = 12.03

Acid Figure

Total 45.0500
Glass 40.0000
5.0500

verlangt 0.25 cc $\frac{1}{10}$ n KOH

$\frac{.25 \times 5.61}{5.05}$ = 0.27

$\frac{18.1 \times 100 \text{ für } 4.3\%}{185 \text{ mittlere zahl für verseifung}}$ = 4.3% Fatty Oils

#2 Perfection L.C. 1010

Sp. G. @ 15°C = 0,870

Viscosity (Reilly) @ 70°F. 4 min. 50 sec.

" " @ 210°F. 0 . 32 sec.

Flash Point 227°C = 440°F.

Saponification Figure = 22.3

Iodine Figure = 8.72

Acid Figure = 0.27 0.13

Fatty Oils = 12%

Saponification

45.1
23.0
22.1

22.9 − 22.1 = .8

$\frac{.8 \times .0561}{2}$ = .022,44

64.4620
63.4571
1.0049

$\frac{022,44}{1.0049}$ = 22.3 mg.

Iodine verbraucht 12.7 Thiosulfat

25.1 − 12.7 = 12.4

65.2010
63.4571
1.7439

12.4 X .01259 = .152116

$\frac{.152116 \times 100}{1.7439}$ = 8.72

Acid Figure

45.0500
40.0000
5.0500

verlangt 0.25 cc $\frac{1}{10}$ n KOH

same as #1 0.27

#3 Kutwell

Sp. G. @ 15°C = 0.930

Viscosity (Reilly) @ 70°F. = 6 min 2 sec

" " " 216 Vol taken on account of alcohol

Flash Point " " " " " "

Saponification Number 33.1

Iodine Figure 10.49

Acid Number 6.05 mg in 3.02

Fatty Oils 17.8 %

Saponification

22.9 − 21.7 = 1.2

$\frac{1.2 \times .0561}{2} = .033,66$ KOH

66.7244
65.7085
1.0159

$\frac{.033,66}{1.0159}$ 33.1 mg KOH

Iodine

68.7145
65.7085
3.0060

verbraucht .1 Thiosulfat

25.1 − .1 = 25

.01259 X 25 = .31475

$\frac{.31475 \times 100}{3.00} = 10.49$

Acid Figure

45.1000
40.0000
5.1000

Verbrauch 5.5 cc $\frac{1}{10}$ KOH

$\frac{5.61 \times 5.5}{5.1} = 6.05$

#4 Banner Sol. Cutting Oil

Sp. G. @ 15°C = ~~15 min~~ 0.9400

Viscosity (Reilly) @ 70°F. = 15 min 35 sec

Saponification Figure 27.7

Iodine Figure = 12.38

Acid Figure = 3.12 3.06

Fatty Oils = 14.9 %

Saponification Figure

43.9
22.0
21.9

22.9 − 21.9 = 1.

$\frac{1. \times .0561}{2} = .028,01$

62.8380
61.8280
1.0100

$\frac{.028,01}{1.01} = 27.7$ mg KOH

Iodine

63.7300
61.8280
1.9020

Verbrauch 6.4 cc Thiosulfat

25.1 − 6.4 = 18.7

.01259 X 18.7 = .235533

$\frac{.235533 \times 100}{1.9020} = 12.38$

Acid Figure

2.8 cc $\frac{1}{10}$ KOH

45.0200
40.0000
5.0200

$\frac{5.61 \times 2.8}{5.02} = 3.12$

L.O. 1011.

Exp. to determine analytical Method for estimation of Shellac $CaCO_3$ and Lampblack in Record Blanks

Take 1g Shellac (Halie) 1g C.P. Calcium carbonate and 1g Lampblack.

Put in beaker added 10 cc 20% NaOH and 10 cc H_2O brought to a boil for 10 min then diluted to 100 cc with water and boiled for 10 min. under constant stirring filtered on a weighed filter.

Total	28.5605	29.6550
Glass	28.0936	28.5605
		1.0945

1.7847
.651
17847
89235
117082
1.2618397

13.3555
12.7036
.6519

1.0945
126
2.35

.700

Aug 12/16.

L 0. 1012

Exp. on Extraction of Shellac from the Record Blank by Alcohol.

Expend 4.2000
25.0000 Grams of 1238E unit 4 / 8/17/16 10.30 AM.
Total 29.2000

			hrs
Time Start	8/17/	4.00 to 5.30	= 1 ½ hrs
	8/18/	8.00 to 600	9
	8/19/	10.00 to 1200	2
	8/21/	8.00 to 600	11
			23 ½

say 24 hrs.

Total Alcoholic Solution 320 cc

25 cc gives a residue after evaporating and burning of 0.0020 = .00008 g as CaO

= 0.0001427 g $CaCO_3$ X 320 cc

= 0.04566 g $CaCO_3$ extracted from a 25 g Sample = 0.1826 %

Residue on watch glass from 10 cc of the 20 cc which remained in the extractor

Total 29.2000
26.0200
3.1800 for 25 g X 4 = 12.7200 for 100 g.
or 12.72 % Shellac taken out in 24 hrs.

Total = 48.8400
~~Paper~~ Filter + Glass 36.6719
~~Glass~~ 12.1681 Wood pulp + Lampblack

=

Total = 12.7537 for 20 cc total 1200 cc
12.6731
.0826

60 = 8.8449 6
25 = 35.37 %

$CaCO_3$

Summary

Shellac Extracted	3.1800 g	= 12.72 %
Wood Pulp + Lampblack left	12.1681	= 48.66 %
Calcium Carbonate by	~~8.6519~~	
g difference	8.8449	3537 38.60
$CaCO_3$ by precipitation	~~8.7450~~	~~34.98~~
	g precip	— ~~96.36~~ 99.98
		96.75
	g difference	

8.6518
8.7450
.8069
diff.

L.O.1012

1238E 8/11/16

Total 29.5000
Expend 4.5000
Record Material 25.0000 g.

On. Aug. 23 at 9.30 A.M.
off Aug 24 at 930 AM } 24 hrs

29.5000
26.3400
25) 3.1600 (12.64 % Shellac
25
66
50
160
150
100

Total 48.8750
Glass & filter = 36.6490
12.2260

12.7750
Crucible = 12.6731
.1019 to 20cc Total 1000
50
5.0950 X 17847 = 9,09.30 / 25

= 36.37 % $CaCO_3$

Shellac by extraction	3.1600 g	=	12.64 %
Wood Pulp & Lampblack	12.2260	=	48.90 %
$CaCO_3$ by difference	9.6140	=	38.45
			99.99 %

$CaCO_3$ by precip 90930 = 36.37 %

12.640
48.90
36.37
97.91

110

Ore Sample from

Aug 23/16

L.O. 1013

Took 1 gram Ore

Total = 13.3248
12.6756
.6492 = 64.92% SiO_2

Total = 12.8840
12.6756
.2084 = 20.84% $Al_2O_3 + Fe_2O_3$

Calcium as

111

Aug. 24/16

Sample of Tin.

~~Dissolved in~~ Gelöst in HNO_3 1.5 Sp. G. 1g material 6cc Säure + 3cc wasser dann heftig von Gemischte Säure dann verdünnt mit 50cc H_2O Filtriert gewaschen mit verdünnte HNO_3 Wasser.

Wachsamen gibt keine von den folgenden reactionen

Mit $K_2Cr_2O_7$ nil

Mit H_2SO_4 nil.

Mit H_2S nil.

dass zinn geglüht und ~~mit~~ gewogen als SnO_2

Tiegel 18.2845
17.0750
1.2095 as SnO_2
788
96760
96760
84665
95306.60

96%

1.2095
788
96760
96760
106.4360

Aug. 24/16

L.O. 1014

Sample of Benzol from Mr Kommerhoff
Car P.T. X 2601

°Cent.	cc	°Cent	cc
78.2	0	78.2	0
78.9	2	78.8	2
79.	5	78.95	5
79.2	10	79.1	10
79.2	20	79.2	20
79.25	30	79.25	30
79.25	40	79.25	40
79.3	50	79.25	50
79.3	60	79.25	60
79.3	70	79.35	70
79.4	80	79.35	80
79.5	90	79.45	90
79.8	95	79.8	95
80.7	97	80.8	97

80.7 − 78.9 = 1.8 — 97 − 2 = 95%

80.8 − 78.8 = 2.0 — 97 − 2 = 95%

LO 1015

Nov. 11, 16

Analysis of Centrifuge Liquor.

Total Acidity by Titration in terms of HCl =	14.94%
Total H_2SO_4 by precipitation	13.583
" HCl by Precipitation	15.583
Magnesium as $MgSO_4$	3.438
Sodium as Na_2SO_4 by difference	18.5
Total solids	21.93
H_2SO_4 combined with Mg as $MgSO_4$	2.8
" " " " Na as Na_2SO_4	12.78

Iron & alumina Traces.
Copper a little.

~~Took~~ 50 cc

46.2860
44.6940
1.5920 as $Mg_2P_2O_7 \times 2$

1.08 Factor 3.438 $MgSO_4$
3.438 × 362 = 1.152 MgO × 0.85 =
2.8 g as H_2SO_4 combined with Magnesia

Acidity
5 cc required 41.5 cc $\frac{N}{2}$ NaOH × 20 × .018
= 14.94 % in terms of HCl

141500
13.9964
.1532 × 20 × 20 = 61.28 × .2543 = 15.58% HCl
4 gal.

5 cc in 100 took 5 cc of this

12.7550
12.6772
.0775 $BaSO_4$ x 20 x 20 = 31.00 X 0.42020
= 13.0262 % H_2SO_4.

L.O. 1676

Nov. 23, 16.

Magnesium Resonate

Dissolve 1377 grams of 98% NaOH in 13 liters Water heat with a steam coil to boiling then add in small portions 13500 grams Rosin. boil for 3-4 hours. then add another 13 liters water, and filter into a solution of 1718 grams MgO calcined from Silver Lake dissolved in 6537 cc HCl. diluted with 10 liters water and filtered. into 40 gal crock and bring up to 30 gal mark. with H_2O. the $MgCl_2$ solution must be kept in constant motion by starting the injection of direct steam into the solution when all the Rosin Soap is in let it boil for 1 hour then filter through bag. put back into 40 gal crock and wash then refilter through bag and last on Buchner funnel. washing the final salts out with water.

L.O. 1017

Dec 2, 16.

Making Ferrous Phosphate.

Dissolved 21.8 g $FeSO_4$ in water
" 13.8 g Sodium Phosphate in water

Divided both in two halves.
#1 Poured the Sodium Phosphate into the $FeSO_4$

#2 Poured the $FeSO_4$ into the Sodium Phosphate

Dec. 12.16.

L.O.1018 Reg Powder for Pound Blank

Total Weight = 29.5700 on 11.00 AM
Weight of shell = 4.5700
Powder 25.0000

Moisture after drying for 3 hrs @ 100°C

Total	18.1330	Total before	18.1330
Glass	14.6027	" after	18.0700
Powder	3.5303	Loss.	.0630

35303.)0630.00 00 (1.7 = 1.7% Moisture
35303
276970

Total Weight after extracting drying 65.7500
$CuCO_3$ + Wood Fibre 43.9045
21.8455

25.0000 Total before extraction
21.8455 after "
3.1545 g Shellac.

25.) 3.1545 (12.61 = 12.61% Shellac
25
65
50
154
150
45

Edison

Dec 19, 16

Analysis of Victor Record
Extraction with alcohol
Total 16.1800
3.6800 Cartoon
12.5000 g Material powdered thru 90 mesh.

Extracted 24 hrs.
Total 16.1800 before
12.8780 after extraction
3.3020 / 12.5000 = 26.4% Extracted by alcohol.

Victor

Loss =

I want to see the Victor powder in microscope

S

1019 Jan 6, 17

Report on 2 samples of Diamonds submitted Jan 4, 17.

Sample #1 Weight before treat with HFl
2.0587
2.0530
.0057 loss

This sample evidently contains no glass

Sample #2 per Eric Dust
This sample was submitted in a damp state

Weight per dry 1.9085
1.8980
Moisture .0105

Treated after ether extract
evaporated a trace of grease present
Hum must be due to method of sampling.

Treated with HF 1.8979
1.6425
.2554 g.

2554 g. = 13.45 %

after taking into consideration the necessary loss of such a finely divided substance e.g. particles that pass through the filter or remain in the pores of the filter it is evident that the sample #2 contains foreign matter not diamond.

(Hazzel.)

1020

Jan 10.17

Test on 2200 gals of Xylol from Barrett for Mr. Mason Gal. S.O. # 4880

cc		
		Barometer 755 m.m.
0	135.5	97 138.7 °C
2	136.2	2 136.2 °C
5	136.3	95% 2.5 °C
10	136.4	
20	136.8	95 138.5 °C
30	137.0	5 136.3 °C
40	137.1	90% 2.2 °C
50	137.3	
60	137.5	Reported by telephone to
70	137.5	Mr. Mason and Copy sent
80	137.8	also sent Copy to Mr. Lockwood.
90	138.0	
95	138.5	666 Pirous Color Card
97	138.7	when shaken 5 min with 95%
		H_2SO_4 10 cc Xylol 90 cc

Jan. 9, 17

L.O. #1022 Time Charged to 4907

Report on Diamonds

8 samples marked lot #1, 2, 3, 4, 5, 6, 7, 8

#1 2.0010 before
2.0010 after HFl
0.0000 loss.

#1 before 2.0010
after fusion 2.0009 NaOH + $NaNO_3$ 1 hour.
0.0001 loss.

#2 2.0090
2.0090
.0000

#3 2.0090
2.0090
.0000

#4 2.0197
2.0080
.0117 gain

2.0201
2.0075
.0126 gain

#6 2.0338
2.0075
.0263 gain

#7 2.0218
2.0015
.0203 gain

#8 2.0096
2.0035
.0061 gain

These gains due to using old lead dishes which were not scrubbed without.

Gellman Diamond Sample.

Treated with HFl. and HNO_3 + HCl.
after treatment

0.4010
.0001
.0009

This may be due to errors in weighing

.4010) 0009.00 (.2% Many blank points

Resubmitted to Mr. Edison for inspection in presence of Mr. Emery declared to be O.K. instructions given to buy. at. 250

Jan. 8, 17.

No. 1021 Diamond Oil (Standard Oil Co)
Sp. G. @ 25°C = 0.8708
Viscosity (Reilly) @ 70°F. = 4 min 49 2/5 sec.
" " " 210°F = 33 sec.
Flash Point 410°F.
Acid Figure = .05 m.g. KOH for 1g Oil = .025% as Oleic Acid
Saponification Figure = 1.21 m.g. KOH for 1g Oil
Iodine Figure = 6.05 g Iodine for 100 g Oil

Acid 5.4044 g Oil Taken required $\frac{.1^{cc} \times 2.8}{5.4044} = .05$ m.g.

Saponification Figure
2.3100 g Oil $.1^{cc} = \frac{.1 \times .0561}{2} = \frac{2.8}{2.31} = 1.21$ m.g.

Iodine Figure
1.5875 g $10.1^{cc} \times .0102 = \frac{1.030 \times 100}{1.5875} = 6.05$ g

After 24 hours spread out thin on a sheet of glass ~~[illegible]~~ exposed to the air no gummy

L.O. 1021

#2 Diamond Grease

Sp. G. @ 25°C = 0.7759

Viscosity @ 70°F. = too thick to take

" @ 210°F. = 3 min 3 sec.

Flash Point = 518°F

Acid Figure = 0.38 mg. KOH for 1 g Oil = 0.19% Oleic Acid

Saponification Figure = 1.99 mg. KOH for 1 g Oil

Iodine Figure = 1.9 g Iodine for 100 g Oil

Acid 4.2990 g .5 cc used

$= \frac{.5 \times .28}{4.299} = 0.38 = 0.19\%$ as oleic

Saponification 1.4055 g .1 cc used

$= \frac{.1\text{cc} \times .0561}{2} = \frac{2.8}{1.4055} = 1.99$ g KOH

Iodine 3.379 6.5 cc used

$6.5 \times .0102 = \frac{.0663 \times 100}{3.3790} = 1.9$ g Iodine

Did not gum in 24 hours in thin layer on a sheet of glass exposed to the air.

L.O. 1021

Capella Oil (Texas Oil Co)

Sp. G. @ 25°C = 0.9170

Viscosity (Reilly) @ 70°F = 4 min 25 sec.

" " @ 210°F = 24 sec.

Flash Point = 320°F.

Acid Figure .035 mg KOH for 1 g Oil = .0175% as Oleic

Saponification Figure = 20.66 mg. for 1 g Oil.

Iodine Figure = 5.15 g for 100 g Oil.

Acid Figure 7.8932 g .1 cc used

$\frac{.1 \times 2.8}{7.8932} = .035 = .0175\%$ as Oleic

Saponification Figure 2.1705 g 1.6 cc used

$\frac{1.6 \times .0561}{2} = \frac{44.88}{2.1705} = 20.66$ mg.

Iodine Figure 1.030 g 5.2 cc used

$5.2\text{cc} \times .0102 \quad \frac{.05304 \times 100}{1.03} = 5.15$ g

for 100 g Oil.

Did not gum same test as on Diamond Oil

1021 H 921 Lubricant (Texas Oil Co)
Sp. G. @ 25°C = .78705
Viscosity @ 70°F = too thick to test
" " 210°F = 2 min 25 sec.
Flash Point = 510°F.
Acid Figure = 0.31 mg KOH per 1g Oil = 0.155% as Oleic Acid.
Saponification Figure = 3.2 mg KOH for 1 g Oil
Iodine Figure = 6.19 g for 100 g Oil

Acid Figure 8.8000g 1.cc

$\frac{1. \times 2.8}{8.8} = 0.31$ mg. KOH = 0.155% as Oleic Acid

Saponification Figure 2.615g .3 cc used

$\frac{.3 \times .0561}{2} = \frac{8.41}{2.6150} = 3.2$ mg. KOH for 1g Oil

Iodine Figure 2.3035g 14 cc used

$14.^{cc} \times .0102 = \frac{.1428 \times 100}{2.3035} = 6.19$ g for 100g Oil

No gumming same test as in the Diamond Oil

L.O. 1022 Sample of Solvent Naphtha from Alabama. Bessemer Edison Benzol Plant.
Bar 760 m.m.

C.C.	deg C.
0	138
2	138.5
5	139.0
10	140.5
20	141.7
30	143.0
40	144.0
50	144.7
60	147.0
70	149.0
80	154.5
90	162.5
95	174.0

95 - 174.0
5 - 139.0
90% - 35.0

90% between 139.0 and 174.0

Sp. G. @ 15°C 0,8870
" " @ 20°C 0,8840

Reported to Mr. Mason showing Requirements of Lunge.

1023 L.O. Sample of diamonds from. Ehrman & Bahlsen
Treated $HCl + HNO_3$ then HFl.

Before treatment	1.9965
after "	1.9910
Loss	.0055

0.27 %

1.9965) .0055,00.00 (
39930
150700

1024 Sample of diamond dust in small Pill Box. No Name

Treated HCl HNO_3 then HFl

Weight before	1.9820
	1.7745
	.2075

This dust is extremely fine and had better be tested if it can be used for grinding or polishing

April 9, 17.

1086 Ext. by Alcohol of Victor Record
As there was no more powder left on hand from Exp. #1018 page 119 made another extraction of a small quantity of a Victor Record

Total	5.9487	Burnable Material	51.5%
Insoluble	.7315	Sol by Alcohol	32.5
	5.2172	Lampblack Flock Etc.	19.0%
		Powder.	100.00
			51.5
			48.5

Total	5.9487
Ext. Extracted	4.0150
Residue	1.9337

Alcohol dissolved = 32.5%

Total =	19.8413	Total	= 16.1440
Brucite =	12.6673	Brucite	= 12.6673
Material =	7.1740	after burning	= 3.4767

7.1740	Total
3.4767	Ash
3.6973	Lampblack + Shellac?

```
                .51.5
7.1740) 3.6973.00.00 (
        3.58700
        1103 00
         7 1740
         3856 00
```


Formula for Shino (Lead Resinate)

25 lbs Rosin
25 lbs NaOH at 20° Bé
Boil for 1½ to 2 hours add a little water at a time as water boils off when boiled enough add about 4 pails of water bring to a boil then filter thru linen bag into then precipitate resinate of Lead with sat. Sol of Lead Nitrate (lbs $Pb(NO_3)$ in water) until no more will precip. then boil filter and wash with water until blue litmus does not turn color.

July 18, 17.

1087

Sample of Wood Flour from Hoffman Union Wood Flour Co after drying 2 hours at 210°F.

Total =	14.6860	14.6860
Glass =	13.6860	14.5670
Material =	1.0000	.1190 = 11.90%

1088

7/19/17

Sample of Acetone from Moving Picture Parson
Tested according to Mirecka.

Residue on evaporation Negligible amount.
Acids none present.
Solubility in water OK
Aldehydes More than a trace
Substances Oxadizable with $KMnO_4$ None
Water less than 3%.
Sp. G. at 15/15 = .8008 = 98% Acetone

Distillation Test

c.c.	% Cent	°F.
0	56	133.
2	56.5	133.6
5	56.5	133.6
10	56.5	133.6
20	56.9	134.4
30	58.1	136.6
40	60.5	140.8
50	63.5	146.2
60	66.0	151.0
70	70.0	158.0
80	73.0	163.4
90	76.0	168.8
95	79.0	174.2
97	80.0	176.0

For English bordite Requirements are $\frac{4}{5}$ of volume must distill over at a temp not exceeding 138°F. For best quality 95% should distill over between 56.0°C – 56.5°C.

Reported to Mr. Brady.

July 24, 17.

1089

Analysis of Silver Mud

712.0000
190.5000 Beaker
521.5 grams total

1.8000
.9900 Filter
.8100 Ag Cl.
in 50cc Sol.

.8100 X 20 = 16.2000g in the total of 1000cc solution

16.2 X .75275 = 12.1945g Ag in the 1000cc

or 521.5g mud = $\frac{12.19}{521.5}$ = .02337g

in 1g Mud. X 453.6 = 10.6 g in 1lb. Mud. = $\frac{10.6}{31.1}$ = .34 Troy ounces

Ans. per Lb. of Mud. or 1.02 Troy ounces silver for every 3 lbs. ~~of~~ dp.. lbs of Mud.

1090

Sample of Acetone received from Moving Picture Division ~~Monday Dec 3~~ Sat, Dec 1, 17.

Acids = none

Empyreumatic Substances = none

Water Test = OK less than 3%

Aldehydes = None

KMnO4 oxidization test = None

Sp. G. @ 15°C = 0.7960 = 100 % acetone

cc	°Cent	°F.
0	55.5	132.0
2	55.7	132.2
5	55.8	132.4
10	55.9	132.6
20	55.9	132.6
30	55.9	132.6
40	56.0	132.8
50	56.0	132.8
60	56.1	133.0
70	56.2	133.2
80	56.5	133.8
90	57.6	135.6
95	59.5	139.0

For English Boiling Point $\frac{4}{5}$ of volume must distill over at a temp. not exceeding 138°F

Best Quality 95% should distill over between 56.0° 56.5°C

This is a much better acetone than last sample.

1091

S.O. 403-1 April 11/18

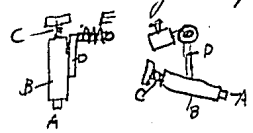
Experiment to produce an Ink or other marking medium whereby the wax recorder of the Business Phonograph may be marked

1st. Aniline Dyes dissolved in water or alcohol do not show up on the dark wax record, except those dyes which dry with a metallic lustre, such as. Methyl Violet 6B Extra. brassy yellow color or. Green M (Copper color) both dyes from Hollard Marx These latter dyes. when mixed with water and applied to a record leaves a metallic mark when dry.

2nd. Fuchsine when mixed with Glycerine containing no water will color with a metallic green lustre but not very good as it does not dry.

3rd. White Ozokerite melted with Olive Oil to render it more soft. then mixed with pigments English Vermillion (red) chrome yellow, Paris Green & extra, allow to cool forming a soft pencil these marks on the record and show up fairly well

Made an attachment whereby these pencils can be attached to machine



A Pencil B Holder C Feed Screw D Arm E Spring.

Pencils

#(1) 5g Ozokerite (White), 5g Olive Oil, 7g Zinc Oxide

#(2) 5g " " 5g " " 2g " " 5g English Vermillion

#(3) Same as #2 except Added .5g Fat Color Safranine

These were melted, well stirred and poured into a little brass mould lubricated with a trace of Olive Oil.

#4 5g Ozokerite (White) 5g Olive Oil, .5g Fat Color Safranine

#5 Same as #4 except .5g yellow Fat Color.

#4 & #5 Do not show up well on the wax not much color.

6 Tried Olive Oil with chalk colored with Oil yellow and oil red over

7 Same using Straw Oil They do not color well all right on paper but do not show up on wax.

8 Used various aniline dyes in Glycerin and Glycerin Solutions

9 Linseed Oil and Oil Orange does not cover readily

10 Rosin Oil 1st Run " " does not cover readily

11 Cottonseed Oil " " does not cover readily

12 Lemon Oil " " covers fair

13 Oil Camphor " " covers fine dries

14 Peanut Oil " " does not cover readily

15 Straw Oil " " does not cover readily

16 Olivia Wood Oil " " does not cover readily

17 Ozocerite " " covers fair dries

By covering is meant that when applied to the wax there is a tendency for the liquid to draw together like a drop of water on wax

all from 9 to the color does not show up good enough on the wax record.

18 Azoberite 5g Straw Oil 5g ZnO 7g

19 Same as #18 except Peanut Oil 5g

20 Same as #18 except Cocoanut Oil 5g

21 Same as #18 except Lard Oil 5g

22 Paraffin 5g Straw Oil 5g ZnO 7g
Tor oil added 5g Paraffin

23 Same as 22 except Peanut Oil 5g

24 Same as #22 except Cocanut Oil 5g

25 Paraffin 5g Lard Oil 5g ZnO 7g

26 Same as # 25 except. Olive Oil 5g

27 Same as # 25 except Beef Tallow 5g Sticks a little to mould

28 Ozokerite 5g Beef Tallow 5g ZnO 7g.

29 Ozokerite 10g Tallow (Beef) 5g ZnO 20g
So much ZnO it does not fuse. works OK

30 Chrome yellow 5g Ozokerite 10g Tallow (Beef) 5g

31 Same as 28 only 10g ZnO sidetracks needle

32 Same as 29 only 15g ZnO Pours.

After a cylinder containing a record washes were made with the various pencils all had a tendency to sidetrack the stylus and cause a partial repeat, excepting the following mixtures which only cause a scraping sound but not enough to indicate the tabbing #1 #2 #29 #32

1092 Parokett · Record

Total =	19.0745	Before	19.0745	
Thimble & Glass	15.4610	after Extraction	18.0155	
Record Material	3.6135	Extracted by Alcohol	1.0590	= 29.3%

Total =	14.1150	14.1150	3.6135
	13.9390	12.6000	1.0590
	.1760	1.5150	2.5545

2.5545 : .1760 :: 1.5150 : X

$X = \frac{2769}{36135}$

Extracted by alcohol 29.3%
Burnt off after Extraction 18.2%
Ash 62.5%

1093 Jewellers Cement

Extraction with Ether Took 9.7975 g cement
Ext with Ether then distilled off Ether.

Total = 51.2670
Flask 50.3880
.8790 Extracted with Ether = $\frac{.8790}{9.7975}$ = 8.9%

5% of this is Ext from the Shellac.

alcohol Ext. Total 24.2550 Total · 24.2550
18.6275 after Ext. 19.4250
5.6275 4.8300

= 85.86% 100 − 85.86 = 14.14% Alcohol Sol

Total = 16.4270 16.4270
15.5380 after burning 12.6000
.8890 3.8270

$\frac{.8890}{3.8270}$ = 23.2% Organic 76.8 Inorganic

Inorganic

Thru 120 Mesh 52.08%
Thru 60 on 120 23.92% Sand

Organic

Ether Ext. 8.9
Alcohol Sol 14.14
Total 99.04

# 2	Infusorial Earth	5	OK but Sand too coarse too light for bottle
	Sand Thru 70	12	
	Rosin	4.5	
	Shellac	10	

# 3	Infusorial Earth	5	O.K but Sand too coarse too light for bottle
	Sand thru 70	24	
	Rosin	10	
	Shellac	15	

%			
57.4 4	$BaSO_4$	50	OK Sand too coarse right weight
13.8	Sand	12	
11.5	Rosin	10	
17.2	Shellac	15	
99.9			

7 oz 2 lbs.

$BaSO_4$	550 g	on hot plate
Sand Thru 110	132 g	on hot plate
Rosin	110 g	melt 150
Shellac	165 g	add shellac gradually
	1,957 (7	

A = 150 Rosin — difference
B = 200 Shellac

1094 Extraction by Alcohol of Victor Record and D17 made by Mr Dinwiddie this for a comparison of a known amount of shellac and an unknown.
Extracted 24 hrs.

D 17.

Total Wt.	= 19.0440	Wt. Total	= 19.0440
Glass & Thimble	= 15.4690	" after Extract	= 17.9520
Material	3.5750	Alcohol Sol	1.0920

3.5750) 1.0920.0000 (30.5
107250
195000
178750

30.5 % Alcohol Soluble

Contained 30.0 %

Victor Ext. 24 hrs.

Total Wt	= 22.0155	Wt Total	= 22.0155
Glass & Thimble	= 19.0040	after Extract.	= 20.9020
Material	3.0115	Alcohol Sol	= 1.1135

3.0115.) 1.1135.0000 (36.8
90345
210050
180690
293600

36.8 Alcohol Sol.

Nictor

Total =	22.1000	Total =	22.1000
Glass & thimble =	19.2050	after Ext =	21.0400
	2.8950		1.0600

2,8950.) 1.0600,0000 (36.6
86850
191500
173700
178000

36.6 %

D — 24

Total =	18.0940	Total	18.0940
Glass & thimble =	15.5270	after Ext. =	17.1790
	2.5670		.9150

2,5670.) 91.50,00.00 (35.6
77010
14900
12835
165500

D-24 overload 35%

All tests made by placing 2 grams on a piece of paper and lighting with a flame — flame

1095 Exp on Making Smoke for U.S.A.

Good Compounder.

75 KNO_3 + 10 S. + 15. C.

#1 15 grams KNO_3 and 5 grams of KCl were mixed in a mortar with enough water to make a creamy paste then dried in oven at 100° C after it was dry 5 grams were ground in wooden mortar to pass thru 100 Mesh then mixed with water to a thin cream and .750 Charcoal and .5 g Sulphur added. then ground until it began to get sort of dry then put 3 inches over hot plate and dried then ground in small portions in wooden mortar.

#2 Same as #1 Except that the KNO_3 and KCl were dissolved in water and evaporated to dryness ground thru 100 mesh mixed with water and sulphur and charcoal dried and ground again thru 100 mesh.

#3 15 grams KNO_3 + 5 g K_2SO_4, 5 g of this mix + .750 g Charcoal + .5 g Sulphur Made same way as #2 fairly quick good smoke

#4 15 grams KNO_3 + 5 g K Phosphate, 5 g of this + .750 g charcoal + .5 g Sulphur Made same way as #2.

5 15 grams KNO_3 + 5 g K Hyposulphite, 5 g of this + .750 g charcoal .5 g Sulphur made same way as #2 Very quick, fair smoke

6 15g KNO_3 + 5g $K_2Cr_2O_7$, 5g of this mix + .750g charcoal + .5g Sulfur made same way as #2

7 15g KNO_3 + 5g Na_2CO_3, 5g of this mix + .750g charcoal + .5g sulfur made same way as #2.
(Much lots of smoke)

8 10 grams KCl + 10g KNO_3 Dissolved in H_2O Evaporated to dryness ground thru 100 mesh 10g of this taken water added to make thin paste .66g Sulfur and 1.50 g charcoal thru 180 mesh added ground in wooden mortar then put 3" above H.A plate on glass slab to dry ground in Wooden Mortar thru 100 mesh.
(Melts U.G.)

#9 10g KNO_3 + 10g K_2SO_4, 10g of this mix + 1.00g charcoal + .66g Sulfur made same way as #8 (Considerable smoke burns very slow – large Residue)

#10 10g KNO_3 + 10g K_2CO_3, 10g of this mix + 1.00g charcoal + .66g Sulfur made same way as #8 (Mg melts no smoke)

11 15g KNO_3 + 5g Na_2CO_3, 5g of this mix + 1.2g Sulfur no charcoal made same way as #2
(Melts but considerable smoke very slow)

12 15g KNO_3 + 5g Na_2CO_3, 5g of this mix + 1.2g charcoal no sulfur. (All charcoal rather slow much more smoke than sulfur only and better)

13 15g KNO_3 + 5g Na_2CO_3, 5g of this mix + .750g Wheat flour + .5g Sulfur.

14 15g KNO_3 + 5g Na_2CO_3, 5g of this mix + 1.2g Wheat flour no sulfur or charcoal

15 90g KNO_3 + 10g Charcoal thru 200 mesh no Sulfur ground moist in wooden mortar dried & ground dry thru 100 mesh.

16 90g $NaNO_3$ + 10g Charcoal thru 200 Mesh ground moist in mortar then dried and ground dry, thru 100 mesh

17 90g KNO_3 25g Na_2CO_3 15.8g charcoal
KNO_3 + Na_2CO_3 Evap to dryness mixed moist with 10g charcoal dried & ground

For every 11.5g mix 1.58g charcoal.

18 90g $NaNO_3$ 25g Na_2CO_3 15.8g Charcoal
$NaNO_3$ + Na_2CO_3 Evap. to dryness mixed moist with 10g charcoal dried & ground

Charcoal used in order to keep the proportion as in 14–20 8.5 to 15
in 90 + 25g or 115g of the mix of $NaNO_3$ + Na_2CO_3 there is 90g $NaNO_3$ so proportion is alone over

17 & 18 made by evaporating the nitrates & soda bicarbonate to dryness and mixing as in # 2.

19 85 KNO_3 + 15 charcoal

20 85 $NaNO_3$ + 15 charcoal

21 90g KNO_3 15.8g charcoal thru 200 mesh 20g Na_2CO_3
12.7 charcoal OK smoke very little residue a little slow

22 75g $NaNO_3$ 15.8g charcoal thru 200 mesh 20g Na_2CO_3
(14.4 C considerable residue little slower than 21 not so much smoke inferior.)

23 90g $NaNO_3$ 15.8g charcoal thru 200 mesh 20g Na_2CO_3
(Poor melted globules 12.7C)

24 75g $NaNO_3$ 15.8g charcoal thru 200 mesh 16g Na_2CO_3
16g = 20% of the total of 75 and 15.8
(Globules too Much Residue 15.C)
75g $NaNO_3$ should liberate as much oxygen as 90g KNO_3

25 90 grams KNO_3 + 15.8 Charcoal + 20g
thru 200 Mesh
$NaHSO_3$
(Pretty good no residue fairly quick.)

26 90 grams KNO_3 + 15.8 g Charcoal + 20 g KCl
thru 200 mesh
(More smoke than 25 no residue fairly quick)

27 90 grams KNO_3 + 15.8 g Charcoal + 20g
thru 200 mesh
$NaH_2PO_2 + H_2O$.
(Little less smoke than 26 effloresce quick no residue)

28 90g $NaNO_3$ + 15.8 Charcoal + 20 g $NaHSO_3$
thru 200 Mesh
(Very slow poor smoke less residue)

29 90g $NaNO_3$ + 15.8 g Charcoal + 20g KCl.
(Good smoke slow some residue)

30 90 g. $NaNO_3$ + 15.8 Charcoal + 20g $NaH_2PO_2H_2O$
Charcoal thru 200 Mesh
(Good smoke slow a little residue)

31 90g KNO_3 + 15.8 g Charcoal + 20g Sodium Arsenate
Charcoal thru 200 mesh

32 90g $NaNO_3$ + 15.8 g Charcoal + 20g Sodium Arsenate
Charcoal thru 200 mesh

33 90g KNO_3 + 35g Na Hypophosphite no charcoal
9.0 6.25 + 0
3.5
12.5

34 90g KNO_3 + 16g Charcoal + 40g
Na Hypophosphite.
90 + 40 = 13.0 = 6.5

35 90g KNO_3 + 15.8g Charcoal + 20g Na Hypophosphite
5.5.

36 90g KNO_3 + 15.8 Charcoal + 20g Potass. Hyposulphite
was a check. on # 27 5.5

37 90g KNO_3 + 15.8 Charcoal + 20g Antimony Metallic
Thru 200 mesh all mixed moist in mortar then dried
and reground.

Para + 40% Formaldehyde precipitate

1 Acetone ✓ Semi
2 Alcohol Denatured ✓ M.S.
3 " Amylic ✓ a little dissolved
4 " Wood ✓ M.S.
5 Amyl Acetate ✓ M.S.
6 Benzine ✓ M.S.
7 Benzole ✓ M.S.
8 Carbon Disulphide ✓ M.S.
9 " Tetrachloride ✓ M.S.
10 Chloroform ✓ M.S.
11 Ether Sulphuric M.S.
12 Ether Petrolic ✓ M.S.

10 = nq lets no smoke.

9 = Considerable smoke - burns very slow - large residue

8 = melts nq

7 - quick - lots smoke + OK

11 melts but
Considerable smoke
Very slow

12 - all Charcoal
rather slow -
much more smoke
than Sulphur only
a better -

21 90 grams KNO_3 + 15.8 g charcoal +
20 grams Na_2CO_3
Ok smoke. Very little residue. 12.7 charcoal
a little slow

22 75 grams $NaNO_3$ + 15.8 charcoal
+ 20 grams Na_2CO_3 14.4 C.
Considerable residue
little slower than 21 = not so much smoke
inferior —

23 90 grams $NaNO_3$ + 15.8 charcoal
+ 20 grams Na_2CO_3 12.7 C.
poor, nickled globules —

24 75 grams $NaNO_3$ + 15.8 charcoal
+ 16 grams Na_2CO_3
globules too much residue 15 1/2 C

[ITEM(S) FOUND IN BOOK]

25 90 grams KNO_3 + 15.8 charcoal + 20 g $NaHSO_3$
pretty good no residue
fairly quick

26 90 g KNO_3 + 15.8 Charcoal + 20 g KCl
More smoke than 25
no residue fairly quick

27 90 g KNO_3 + 15.8 Charcoal + 20 g Na H_2O
bubbles smoke like 26 Explosive, quick no residue

28 90 g Na NO_3 + 15.8 Charcoal + 20 g Na HSO_4
Very slow poor smoke
has residue

29 90 g Na NO_3 + 15.8 Charcoal + 20 g KCl
good smoke slow
some residue

30 90 g Na NO_3 + 15.8 Charcoal + 20 g Na H_2PO_2 H_2O
good smoke slow
a little residue

31 90 g KNO_3 + 15.8 Charcoal + 20 g Na Arsenite
good smoke some residue
nothing Explosive

32 90 g Na NO_3 + 15.8 charcoal + 20 g Na ClO_3
Smoke not great
Big residue

[ITEM(S) FOUND IN BOOK]

33 90g KNO_3 + 35g Na Hypophosphite
No charcoal. Ng -

34 90g KNO_3 + 16g Charcoal + 40g
Na Hypophosphite Explodes -
a little, occasional, smaller
smoke

35 90g KNO_3 + 15.8 Charcoal + 20g
Na Hypophosphite
Explodes - smoke abt
same as 34 - ND

34 & 35 used about more Hypo

36 90g KNO_3 + 15.8 Charcoal + 20g
Na Hyposulphite - Explodes
more smoke than 34 - 35
not quite enough with
about more Hypo -

37 90g KNO_3 + 15.8 Charcoal + 20g
Antimony Metallic thru 200 mesh.
Slightly Explosive -
More smoke than 34
5 + 6 - Big volume
reaction. not prominent

13 Ether Acetic ✓ . N.G

14 Fusel Alc ✓ N.G

15 Gasolene ✓ N.G

16 Kerosene ✓ N.G

17 Solvent Naphtha ✓ N.G

18 Turpentine ✓ N.G

19 Alt-Camphor N.G

20 Trichlorethylene N.G

21 Perchlorethylene N.G

22 Dichlorethane

E/H # 1096 Resinate of Magnesia Acetate
Solvent for Sample Recd from J.A.E. June 17, 18.

1 Alcohol ✓ Denatured N.G.

2 Acetone ✓ Acetone was very yellow N.G.

3 Benzine ✓ N.G

4 Benzol ✓ Dissolves O.K ✓

5 Carbon Tetrachloride ✓ Starts to dissolve readily but leaves a white precip. Semi Solvent

6 Chloroform ✓ Dissolves immediately in cold O K

7 Ether Opalescent

8 Ether Petrolic ✓ N.G.

9 Kerosene N.G.

10 Methyl Alcohol Softens N.G.

11 Amyl Alcohol ✓ Nearly all ✓

12 Amyl Acetate ✓ Dissolves leaves a little residue
all

13 Gasolene ✓ N.G.

14 Acetic Ether ✓ N.G.

15 Solvent Naphtha ✓ Semi

16 Fusel Oil ✓ N.G.

17 Turpentine ✓ N.G.

18 Carbon Disulphide N.G.

19 Camphor Oil N.G.

1097 Complete Data on Analysis of Victor Record

From Page 114 An old record gave by alcohol or Soxhlet 26.4% extracted.

From Page 132 Record gave the following.

		Total burnable material
Ext. by Alcohol	32.5%	51.5%
Lampblack etc.	19.0%	Subtracting the 56.6% from
Unburnable	48.5	page 152 we have
	100.0	

Ext by Alcohol	36.6
Lampblack etc	14.9
Unburnable	48.5

From Page 148 Parshall Record

Ext by Alcohol	29.3%
Burnt off after Extn.	8.2%
Ash	62.5%

Page 151-152 Expt. of Victor and Dunwoldre Records by Alcohol to check up the method. Records show that Ext. Method gives 0.5% too high a result.

A 5 gram sample

Extraction with Ether Petrolic for Resin gave

119.8070
119.7370
.0700 from 5. grams or 1.4 %

Same sample after Petrolic Ether Ext.

Extracted with Sulphuric Ether = $\frac{.0700}{1.8160}$ = 3.85 %

120.2500 Flask + Extract. Material
119.7370 Flask.
.5130 Extracted

$\frac{.5130}{5}$ = 10.26 %.

Based on the Shellac content of 36.6 %

36.32 %
5
1.8160 grams Shellac in 5 grams.

$\frac{.5130}{1.8160}$ = 28.24

Alcohol Extraction after both ether extractions.

Total = 120.9700
119.7370
5.) 1.23.30 (24.66 %
10
23
20
33
30
30

$\frac{1.233}{1.8160}$ = 67.89

Petroleum Ether	1.4 %
Ether	10.26 %
Alcohol	24.66
Total	36.32

1896

Extractions based total of 36.32 grams Extracted with hot Alcohol.

Then

Ext with Petrolic Ether	=	3.85
" " Sulphuric Ether	=	28.24
" " Alcohol	=	67.89
Total	=	99.98

Extraction of XXPP #3 Water Shellac

3g Taken

Ext with Petrolic Ether	=	0.5
" " Sulphuric "	=	3.66 %
" " Alcohol	=	92.46
		96.62
Loss in heating 6 hrs		2.50
Total		99.12

99.9
991
.8

Total = 121.1050
Glass = 121.0900
.0150 Petrolic Ether

$\frac{.0150}{3.}$ = 0.5 %

Total 123.8640
121.0900
2.7740

$\frac{2.7740}{3.}$ = 92.46 %

Total 121,2000
Glass 121.0900
.1100

$\frac{.1100}{3.}$ = 3.66 %

2 g Shellac on hot flask 6 hours
" after ether

2.0000
1.9500
.0500
2

$\frac{.0500}{2}$ = 2.5 %

#1697 Solvent for precipitated Resinate of Manganese

1 alcohol Denatured ✓ N.G.

2 alcohol Amylic ✓

3 Acetone ✓ N.G.

4 alcohol Wood ✓ N.G.

5 Amyl Acetate ✓

6 Benzine ✓ N.G.

7 Benzole ✓ OK

8 Carbon Disulphide ✓ Serin

9 Chloroform ✓ dissolved without shaking OK

10 Carbon Tetrachloride ✓ Serin.

11 Ether ✓ N.G.

12 Ether Petrolic ✓

13 Fusel Oil ✓

14 Gasolene ✓ N.G.

15 Kerosene ✓ N.G.

16 Naphtha Solvent ✓ Dissolved without shaking Very Good

17 Turpentine ✓ N.G.

18 Ether Acetic ✓ N.G.

19 Oil Camphor Good.

20 Tri chlor Ethylene.

21 Per chlor Ethylene

22 Dichlor Ethane

Solubility of Resinate of Manganese

35 cc Benzol dissolved 10.00 − 3.65 = 6.35 g

Resinate of Manganese

35 cc High Boiling Solvent Naphtha 10.0 − 6.4 = 3.6 grams

over

35 ⅭⅭ Solvent Naphtha from Small bottle
distilled 10. grams
Solvent Naphtha from Small Bottle and S.B.Co

from S.B. Co		Small Bottle
cc	°Cent	
0	147	132.5
2	148	134.0
5	149.5	135.0
10	150.0	136.5
20	153.0	137.9
30	154.5	140.2
40	156.0	141.2
50	158.0	143.0
60	160.0	145.0
70	162.5	147.5
80	165.6	151.5
90	170.5	163.0
95	174	183.0
97		
100		

P Xylol 138
M " 139.8
O " 142–143

cc.	°Cent.	
0		
2		
5		
10		
20		
30		
40		
50		
60		
70		
80		
90		
95		
97		
100		

cc.	°Cent.
0	132.5
5	134.0
2	136.5
10	137.9
20	141.2
30	143.0
40	145.0
50	147.5
60	151.5
70	163.0
80	183.0
90	
95	
97	
100	

July 3/18
1400

Distillation of Solvent Naphtha from American Oil and Supply –
Sp. G. at 15°C = 0,860 = 32.8° Bé

c.c.	°Cent.
0	132.0
2	134.0
5	136.2
10	139.5
20	141.6
30	144.5
40	146.0
50	148.2
60	150.8
70	154.0
80	158.5
90	168.5
95	180.5
97	
100	

Resin Compounds.

Manila Copal 8 grams + .2 grams Para Rubber
Heated and dissolved rubber therein takes quite a high temperature and much crushing of the rubber

I tried to get in .5 grams but this went in very hard, and is very sticky when cool.

Manila Copal does not dissolve well in Solvent Naphtha but softens up even in cold Naphtha and becomes rubbery and plastic.
When the copal is previously melted then it will dissolve in Solvent Naphtha but upon dilution with more Naphtha a precipitate which is gummy is formed which only partially redissolves on heating.
The thick solution of Manila Copal in Solvent Naphtha when mixed with Para Rubber dissolved in Solvent Naphtha gives a gummy precipitate.

Gum Olibanum does not melt well and chars easily.

Singapore Dammar melts easily but froths up very much which on continued heating subsides soon enough so that it can be found dissolves the Para Rubber

8 grams Singapore Dammar with 1 gram Para Rubber. Sticky after cooling

Singapore Dammar dissolves easily in cold Solvent Naphtha and mixes very easily with Para Rubber dissolved in Solvent Naphtha

Gum Kauri melted with Para Rubber takes up the rubber but either by heat it becomes so brittle that it crumbles up.

1102

Gave Mr. Dinwiddie the following to try and mix with shellac.

Ortho Cresol, Para Cresol, Meta Cresol, White Tar Cresol. Phenol,

Anthracene Oil

cc	°Cent	
0	195	Solidifies at room temp
2	215	
5	225	
10	235	
20	245	
30	255	
40	277	Solidifies only when kept in Ice + Salt
50	306	
60	330	Solidifies at room temp.
70	340	
80	355	
90		

This is the Anthracene Oil from which the anthracene is obtained and not the non crystallizable portion left after removal of the anthracene

1103

July 13/18

Distillation of Samples of Creosote & Anthracene Oils for Mr. Dimiddie

Sample of residue oil from American Creosoting Co from Seaboard By-products Coke Co		
Cubic Cent.	°Cent.	
0	—	
2	180	
5	191	
10	195	
20	203	
30	204	
40	218	
50	228	
60	240	
70	260	
80	291	
90	305	
95		

Does not mix with Shellac (tried by Mr. Dimiddie)

Creosote Oil #106 R.H. Cathcart Co Equitable Building Wilmington Del. sample given by American Creosoting Co. Newark		
Cubic Cent.	°Cent.	
0	200	
2	205	
5	210	
10	218	
20	227	
30	235	
40	240	
50	254	
60	261	
70	290	Crystallizes ordinary temperature
80		
90		
95		

M & W Creosote Oil used for R.R. Ties from Barrett Co sample from American Creosoting Co		
Cubic Cent.	°Cent	
0	207	Cryst. ordinary Temp
2	215	
5	217	
10	220	
20	228	
30	235	
40	241	any crystalizes when chilled on ice
50	257	
60	300	Cryst Ordinary Temp.
70	310	
80	320	
90	350	
95	360	

Orange Paving Block Oil. American Creosoting Co		
Cubic Cent.	°Cent.	
0	190	
2	200	
5	208	
10	220	Crystallizes Ordinary Temp.
20	230	
30	240	
40	255	
50	295	
60	340	
70	400	
80		
90		
95		

Sample of Dead Oil from
Bayway Chemical Co.
Bayway N.J.

Acid Cent.	°Cent.	
0	180	
2	185	
5	202	
10	213	
20	223	
30	230	
40	238	
50	241	
60	254	
70	265	
80	284	
90	312	Crystallizes Ordinary Temp.
95	340	

Crystallizing tests made by letting a drop fall on a glass plate

~~Chemicals~~ Made for 5005

Tungstate of Barium, Dissolved WO_3 in NaOH filtered then precip. $BaWO_4$ with $BaCl_2$ washed thoroughly dried in air.

Ammonium Magnesium Phosphate Dissolved Na_2HPO_4 in water added NH_4Cl and NH_4OH in excess then precip. with $MgSO_4$ giving $NH_4MgPO_4 \cdot 6H_2O$ washed thoroughly then dried in air.

Lithium Phosphate, Dissolved Lithium Carbonate in HCl filtered then precip. with Na Phosphate. washed and dried in air.

~~Calcium~~ Tungstate made same method as the Ba salt using $BaCl_2$

Bismuth Oxide made by roasting the Carbonate
Nickel Oxide " " " " Oxalate
Cadmium Oxide " " " " Carbonate

Antimonic Acid made by dropping $SbCl_5$ into water (cold) and washing with cold water then dried in air. H_3SbO_4

Ba Antimonate made by dissolving the antimonic acid previously made in KOH filtering then precip. with $BaCl_2$ washed then dried in air (Test) dissolved in HCl passed H_2S gas the antimony as sulfide, boiled filtrate free of H_2S added ammonia and NH_4 carbonate Barium carbonate precipitated.

Na Antimonate made by dissolving the antimonic acid Sb_2O_5 in KOH and precip with common salt. washed and dried in air. (Test) K Pyro Antimonate after precip. Sb. with H_2S boiling off H_2S gave free of Na Pyro Antimonate.

Molybdic Acid made by dissolving Na Molybdate in water conc. sol and prec. molybdic acid with HCl being careful not to have an excess. washing and drying in air.

The Three Methods of making $Mg(OH)_2$

Method #1 L.O. Book

Magnesium Hydroxide made by pouring a solution of Magnesium Sulphate into an excess of NaOH. washing by decantation filtering and drying in air. Dries translucent homogenious mass

Method #2 L.O. Book

Magnesium Hydroxide made by pouring Magnesium Sulphate Solution Sp. G. 1.2722 @ 15°C 1500 cc into 8 cc 20% NaOH thus having 5% NaOH in Excess. pouring into iron metal pans and drying on the hot plate then cooling in water to get it all in a glass jar and washed by decantation, filtered on vacuum filter and dried in air Sulphate from barrel in store room.

Method #3 Solid Magnesium Sulphate ~~and~~ containing less than $6H_2O$ from the barrel in the Store Room mixed in a mortar with dry NaOH powdered having NaOH in excess then spread out on fire plates and dried on hot plate then washed by decantation and filtered, dried in air Does not dry translucent but granular. washed free from Sulphates

Settles very quickly in jar

over

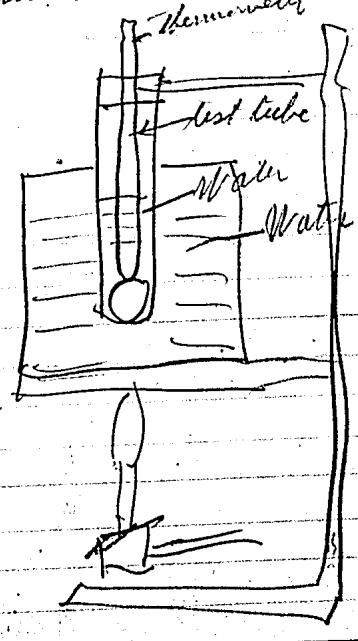
(1817)

By method #2 it was expected to get large lumps very compact as in the case of $Ni(OH)_2$ but this did not occur, it settles very slowly in the jar when working by decantation although not as slow as by Method #1.

1106

Test of Grade I Rosin
for temperature effect.

$\frac{126 F}{52}$ Cent. with a little pressure the thermometer just makes an impression on it at $\frac{135 F}{57}$ ° Cent the thermometer starts to sink in of its own weight at $\frac{167 F}{75}$ ° Cent about like very heavy molasses at $\frac{194 F}{90}$ ° Cent. about like soft butter and at $\frac{212 F}{100}$ ° Cent Rosin left the thermometer bulb and floated to the top of the water.



Records for Mr. Edison put on hot plate Sat. Sept. 14th at 11.40 A.M.
Plates put in large crystallizing dish raised 1 inch from hot plate
Plates covered 1 inch above top plate with 5% H_2SO_4 Sp. G 1.031
Temp. at 12.40 = 50°C = 122 F.
Temp of H_2SO_4 when poured on 40.0 Cent.
Distilled water added from time to time.
Off Friday Sept. 20 at 11 AM
Total liquid 1700 c.c. took for nickel determination 85 cc or $\frac{1}{20}$th.

Total Wt = 15.1200
Wt of Cone = 14.3000
$Ni(OH)_2$ = .8200

92.7 − 58.7 :: .822 : X

$\frac{58.7 \times .822}{92.7}$ = .520 grams Ni X 20

= 10.4 grams Nickel dissolved.

[ITEM(S) FOUND IN BOOK]

Johnstown Pa. 11/24/15

Sample taken from about 5000 Gals (#4.9) in Tank Car.

2	78.15	
5	78.3	
10	78.35	Mr Mason
20	78.4	
30	78.4	
40	78.45	
50	78.5	
60	78.5	
70	78.55	
80	78.55	
90	78.6	
95	78.65	78.75
97	78.75	78.15
all av.	78.75	.6

[ITEM(S) FOUND IN BOOK]

100 grams Rosin + 10 grams Manganese Resinate

60° Cent = 140 F. can just make an impression on the Resin Mixture by applying pressure to the Thermometer

at 70° Cent = 158 F. Thermometer sinks in of its own weight.

at 82° Cent = 180 F about like very heavy vaselene or tar

at 95° Cent 205 F. Soft heavy like butter

at 100° Cent starts to leave thermometer and float to the top.

100 grams Rosin + 20 grams Manganese Resinate

at 68° Cent = 154 F. can just make an impression on the resin mixture by applying pressure to the thermometer

at 75° Cent = 167 F. thermometer sinks in of its own weight

at 92° Cent = 198 F like very heavy vaselene

100° Cent = 212 F starts to leave thermometer and rise to the top very slowly much slower than the 10 %

[ITEM(S) FOUND IN BOOK]

100 grams Rosin + 30 grams Manganese Resinate
at 73° Cent = 163F can just make an
impression on the Rosin Mixture by applying
pressure to the thermometer,
at 78° Cent = 172F. thermometer sinks
in of its own weight at 100° Cent = 212F
like heavy roselene does not leave
the thermometer and rise to the surface.

100 Rosin + 40 grams Manganese Resinate
at 76° Cent = 169F can just make
an impression on the Resin Mixture
by applying pressure to thermometer
at 82° Cent = 180F thermometer sinks
of its own weight
at 102° Cent = 216F like heavy roselene
at 107° Cent = 225F like soft butter
at 110° Cent = 230F just starts to
rise to top.

[ITEM(S) FOUND IN BOOK]

Get. Oleates

100 grams Rosin + 50 grams Manganese Resinate at 82° Cent. = 180 F can just make an impression on Resin Mix by applying pressure to thermometer

at 90° Cent. = 194 F. thermometer sinks of its own weight.

at 105° Cent = 221 F about like heavy vaseline

at 110° Cent = 230 F Like soft butter

at 113° Cent = 235 F just starts to rise to the top of solution.

100 grams Rosin + 75 grams Manganese Resinate at 89° Cent = 192 F. can just make an impression by pressing on the thermometer

at 97° Cent = 207 F thermometer sinks of its own weight

at 110° Cent = 230 F about like heavy vaseline

at 115° Cent. = 239 F like soft butter

at 117° Cent. = 243 F. just commences to rise to the top.

[ITEM(S) FOUND IN BOOK]

100 grams Rosin + 100g Manganese Resinate
at 92° Cent = 198 F can just make
an impression by pressing on the thermometer

at 104° Cent = 219 F thermometer sinks
of its own weight.
at 120° Cent. = 248F like heavy vaseline
at 126° Cent = 259F like soft Butter
at 128° Cent. = 262F just starts
to rise to the top

100 grams Rosin + 100 grams Manganese
Resinate which has been boiled a little
longer

at 95° Cent = 203 F. can just make an
impression by pressing on the thermometer
at 104° Cent = 219F. Therm. sinks of its own weight
at 120° Cent = 248F. like heavy vaseline
at 127° Cent = 261 F like soft butter
at 130° Cent = 266 F just starts to
rise to the top.

[ITEM(S) FOUND IN BOOK]

Na_2HAsO_4 —

Not given without water but.

$Na_2HAsO_4 \cdot 7H_2O$

$Na_2HAsO_4 \cdot 12H_2O$

(25) Na Bisulphite, $NaHSO_3$

(26) KCl

(27) Sodium Hypophosphite

$NaH_2PO_2 + H_2O$

[ITEM(S) FOUND IN BOOK]

Parts –

90% KNO_3
15.8 Charcoal
20 – Carb Na in
place of 25 $NaNO_3$

Duplicate
$NaNO_3$

[ITEM(S) FOUND IN BOOK]

O. P. D. Report July 1, 18.

Manila Copal	pale	22¢
" "	Old Sorts	14
Pontianak	Selected Fine	24¢
"	No 1	20
"	Nuts	14
Damar	Batavia	29
"	Singapore No 3	14
Kauri	No 3	17
Euphorbium		25
Olibanum	Tears	16

[ITEM(S) FOUND IN BOOK]

RECORD

Records put on hot plate Saturday Sept. 14th at 11.40 A.M.
Raised 1 inch above hot plate.
Liquid 1 inch above plates.
Sulphuric Acid 5% Sp. G. 1,031
2700 cc. Temp. 40 C when found on
Temp. at 12.40 = 50°C = 122 F
Monday Sept. 16th 8.30 liquid was just below surface of top plate added distilled Water.
Total amount sol at present
Friday Sept. 20th at 11 AM. = 1700 cc
Precipitate from solution received this morning on opposite bench
Took for analysis 85 cc 1/20 of Qn.
.8200 g Ni OH. =

8 grams Gum Olibanum
2 grams Para Rubber
Olibanum swells up and clears does not melt good.
Mastic leafal
In Solvent Naphtha does not seem to dissolve but softens up and gets gummy and plastic
but if the leafal is first melted then it dissolves in Solvent Naphtha but if this is added to para rubber dissolved in Solvent Naphtha a gummy precipitate occurs. also in dissolving the dissolved leafal with Solvent Naphtha a pitch occurs which only partly redissolves on heating.

[ITEM(S) FOUND IN BOOK]

H_2S acid sol CuS Black precip.
NaOH Blue Precip
Na_2CO_3 Basic $Cu_2(OH)_2CO_3$ Blue precip
by boiling dark brown
$K_2C_2O_4$ CuC_2O_4 red brown precip, sol
in NH_4OH dark green color
K_4FeCy_6 Cu_2FeCy_6 red brown precip

H_2S Black precip in Neutral or acetic acid sol
NaOH green precip
Na_2CO_3 Basic precip green
Na_2HPO_4 light green precip sol in NH_3 $Mn_3(PO_4)_2$
K_4FeCy_6 green white precip

[ITEM(S) FOUND IN BOOK]

Exp. to determine if the Alcohol Soluble in a Victor Record is all Shellac.

5g Victor Record ground and screened thru 100 mesh was extracted by Petrolic Ether in an extraction thimble, the extracted material together with solvent being caught in a weighed flask then the solvent evaporated and the extraction weighed the Record Material left in the thimble was then dried to get rid of the pure solvent remaining after extraction and then the extraction repeated with Sulphuric Ether, in the same way as above. Then extracted with Alcohol in the same manner as with the other two solvents.

Petrolic Ether	1.4 %
Sulphuric Ether	10.26
Alcohol	24.66
Total extractable material	36.32 %

36.32 % of 5 grams = 1.8160 grams shellac in 5 grams record material so figuring on the basis of 36.32 % shellac or 1.8160 grams we have.

Petrolic Ether	3.85
Sulphuric Ether	28.24
Alcohol	67.89
	99.98

[ITEM(S) FOUND IN BOOK]

Petrolic Ether	.5
Sulphuric Ether	3.66
Alcohol	92.46
Lost on hot plate	2.5
Total.	99.12

This apparently shows that the Beetle Record is made of straight shellac. also that the shellac in being heated loses some soluble matter. It also shows that the shellac when heated or aged becomes less soluble in Alcohol but more soluble in Sulphuric Ether.

I am heating some xx pp#3. Shellac on the hot plate for a few days ~~then will~~ extract to see if this proves out.

2 Att

Petrolic Ether

119.8070 Total
119.7370 Flask
Extracted .0700 $\frac{.0700}{5.} = 1.4\%$

Figured on the basis of 36.32% Extractable

$= \frac{.0700}{1.8160} = 3.85\%$

Sulphuric Ether

120.2500 Total
119.7370 Flask
Extracted .5130 $\frac{.5130}{5.} = 10.26\%$

Figured on the basis of 36.32% Extractable

$= \frac{5130}{1.8160} = 28.24\%$

Alcohol

120.9700 Total
119.7370 Flask
Extracted 1.2330 $\frac{1.2330}{5.} = 24.66\%$

Figured on the basis of 36.32% Extractable

$= \frac{1.2330}{1.8160} = 67.89\%$

[ITEM(S) FOUND IN BOOK]

Three grams of XX.PP #3 Shellac same as the Vector use was extracted in the same manner as the record.

Petrolic Ether

121.1050
121.0900
.0150 $\frac{.0150}{3.} = 0.5\%$

Sulphuric Ether

121.2000
121.0900
.1100 $\frac{.1100}{3.} = 3.66\%$

alcohol

123.8640
121.0900
2.7740 $\frac{2.7740}{3.} = 92.46\%$

2 grams XX.PP #3 Shellac on hot plate 6 hrs

2.0000
1.9500
.0500 $\frac{.0500}{2.} = 2.5\%$ Gms

[ITEM(S) FOUND IN BOOK]

Sample of Ore from Muscle Shoals

Moisture (heating to 110°C	= 4.48
After heating 110°C Loss on ignition	= 12.17 %
Insoluble (Aqua Regia)	43.55
Iron Alumina figured as $Al_2O_3Fe_2O_3$	23.32
Manganese figured as Mn_3O_4	19.78
Cobalt Trace	
Nickel slight Trace	
Zinc Trace	
	103.27 %

This corresponds to a Bay Manganese.

Solvent Naphtha from S.P. Co

cc	°Cent
0	147
2	148
5	149.5
10	150.0
20	153.0
30	154.5
40	156.0
50	158.0
60	160.0
70	162.5
80	165.6
90	170.5
95	174
97	
100	

[ITEM(S) FOUND IN BOOK]

75	KNO_3	75	45
25	KCl	5	15

20 g + 2 charcoal.

20 g + 4 "

20 + 6 "

Normal proportion KNO_3 74 S 10 C 16

74 16% C.

$\frac{74}{16}$
$\frac{84}{16}$
$\frac{100}{}$

$\frac{2}{20}$ $\frac{1}{10}$ 10%

$\frac{8}{20}$ $\frac{2}{5}$ 30

Labor für alkohol ext.

5.6275 Summen

18.6275
5 6275
24.2550

Total = 24.2550

Glas + Filter = 18.6275

alkohol sol. 5.6275

Total = 24.2550

After extract. = 19.4250
material + Glass + filter

4.8300

85.86% insol

5.6275.) 4.8300.00000
4500000
3300000
2813375
486250
4500000
362500

14.14
8.9
23.0

[ITEM(S) FOUND IN BOOK]

Burnt.. Total 16.2370
after 12.6000
3.6370

Total 16.2370
Burnable 16.2230
36.370) .0140.00 00
.5

40.9
100.00
85.86
14.14

[ITEM(S) FOUND IN BOOK]

.2970 3.6135 / 2970.0000 (= 8.2

2890 80
79200
72270
0

Parakeett

Total = 19.0745 Before 19.0745

Shell & Glass = 15.4610 After Ext. 18.0155 Metal

Round Malvine 3.6135 1.0590

3.6135 / 1.0590.0000 (= .293

72270
336300
325215
110850

2.5545
.1760
1532700
178815
25545
1.5150 / .44969200 (.2969
3.0300
146692
136350
108420
106050
3700

1.5150 / .1760000 (= 11.6%

15150
24500
15150
93500
90900
2600

90 : 101 :: X : 85

85 X 90 = 7650 / 101 = 75.7 g Na MnO_3

90 -

90 %
15 %
20 %
125 %

15

[ITEM(S) FOUND IN BOOK]

K=39
N= 14

$NaNO_3$ 85.
KNO_3 101.

K + N = . + O_3 = 3x 16 48
39 + 14 = 53 + 48 = 101

Na + N + O_3 = 3x16 = 48
23 + 14 = 37 + 48 = 85

With Sodium Nitrate there are 48 oxygen in every 85 grams
With Potassium Nitrate there are 48 oxygen with every 101 grams

$FeSO_4$ 32
64
96

56
96
152 gms 1 fe
$Fe(OH)_2$

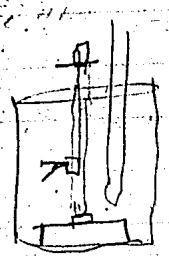
152
96 800 350
2
192 300
812

[ITEM(S) FOUND IN BOOK]

$Fe(OH)_3$ 106. 278

3

534

~~500 grams~~

$K_3Fe(CN)_6$ [illegible]